PROJECTIONIST

INTERNATIONAL

JULY 1954

VOLUME 29 • NUMBER 7

30c A COPY • $2.50 A YEAR

IN TWO SECTIONS • SECTION ONE

For

CINEMASCOPE

Peerless HY-CANDESCENT TRADE MARK REG.

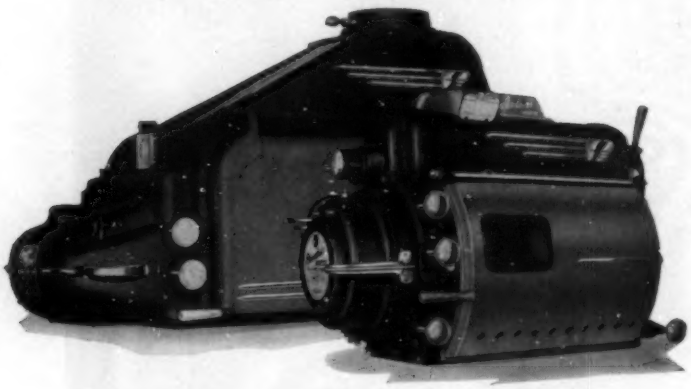
CINEARC

32,000 TOTAL LUMENS *

At 180-185 Amperes . . . With No. 15363-Q and No. 15367-P, "Hy-Speed" Condensers . . . With a .715" x .912" "CinemaScope" aperture . . . With a 3" Focus, F-1.8 coated projection lens . . . On any kind or any size of screen . . . .

Using presently available and **standard** carbons, there is "No other projection lamp in the world, today" that can produce so much light.

(*) Subject to 6-10% average deduction for PEERLESS "Hy-Lumen" Heat Filter, if used.



TRUTH IN ADVERTISING

Peerless MAGNARC TRADE MARK REG.

CINEARC

22,000 TOTAL LUMENS †

At 75-77 amperes . . . With presently available and standard 8 x 9 m/m copper coated carbons . . . With a .715" x .912" "CinemaScope" aperture . . . With a 3" Focus, F-1.8 coated projection lens . . . With a 14" diameter No. 2012 PEERLESS "Hy-Lumen" glass reflector that retails at a list price of $22.00 . . . With a No. 2880 PEERLESS Tail Flame Flue . . . On any kind or any size screen . . . .

All of this, at the **lowest** possible first, and operational **cost.**

(†) **NO** heat filter of any kind required.

Buying less to save money is like stopping the clock to save time

J.E.McAULEY MFG.CO.

552-554 WEST ADAMS STREET

CHICAGO 6, ILLINOIS

INTERNATIONAL PROJECTIONIST

With Which Is Combined PROJECTION ENGINEERING

JAMES J. FINN, *Editor*

JAMES MORRIS, *Associate Editor*

Volume 29 **JULY 1954** **Number 7**

Index and Monthly Chat	3	In the Spotlight	14
Evolution of the Modern Projection Lens — ROBERT A. MITCHELL	5	Eyes and Ears	16
Maintenance of Sound Quality With Magnetic Pickup Heads — EDWARD STANKO	8	Schlanger's "Sanity" Projection Standard	16
New Light on the Past — FREDERICK GOOCH	10	IA Obituaries	22
To Which Mr. Mitchell Replies . . .	11	Personal Notes	22
Letters to the Editor	12	Mid-Summer Musings	23
New Westrex Sound Reproducing Equipment	13	New Lamphouse Blower	26
		News Notes	
		Technical Hints	
		Miscellaneous Items	

Published Monthly by

INTERNATIONAL PROJECTIONIST PUBLISHING CO., INC.

19 West 44th Street, New York 36, N. Y.

Telephone: MUrray Hill 2-2948

R. A. ENTRACHT, *Publisher*

SUBSCRIPTION REPRESENTATIVES

AUSTRALIA: McGills, 183 Elizabeth St., Melbourne

NEW ZEALAND: Te Aro Book Depot, Ltd., 64 Courtenay Place, Wellington

ENGLAND and ELSEWHERE: Wm. Dawson & Sons, Ltd., Macklin St., London, W. C. 2

YEARLY SUBSCRIPTION: United States and possessions, $2.50 (two years, $4); Canada and foreign countries, $3; single copies, 30 cents. Changes of address should be submitted two weeks in advance of publication date to insure receipt of current issue. Entered as second class matter February 8, 1932, at the Post Office at New York, N. Y., with additional entry at Yonkers, N. Y., under the act of March 3, 1879.

Entire contents copyrighted 1954 by INTERNATIONAL PROJECTIONIST PUBLISHING CO., INC. INTERNATIONAL PROJECTIONIST assumes no responsibility for personal opinions appearing in signed articles, or for unsolicited communications.

MONTHLY CHAT

IT IS NOW more than 60 years since a farsighted group of theatrical workers founded the labor union that grew into the great International Alliance of Theatrical Stage Employes and Moving Picture Machine Operators of the United States and Canada. In a little more than half a century this organization has risen from humble beginnings into a brotherhood which joins together the complicated technical skills that make the modern entertainment industry possible.

Those who handle film, who photograph dramas, comedies or news on such film; those who direct photography; those who handle the operations of studios; those who record sound; those who handle film in the exchange; those who project it, and those who service equipment are among the wide variety of theatrical employees who belong to the IA. They are now being joined in larger and larger numbers by skilled workers from the field of television and the allied arts.

At almost every moment from the time that the idea for a motion picture or a "live" theatre entertainment is conceived to the moment when it is presented to an audience, the IA worker plays a vital part.

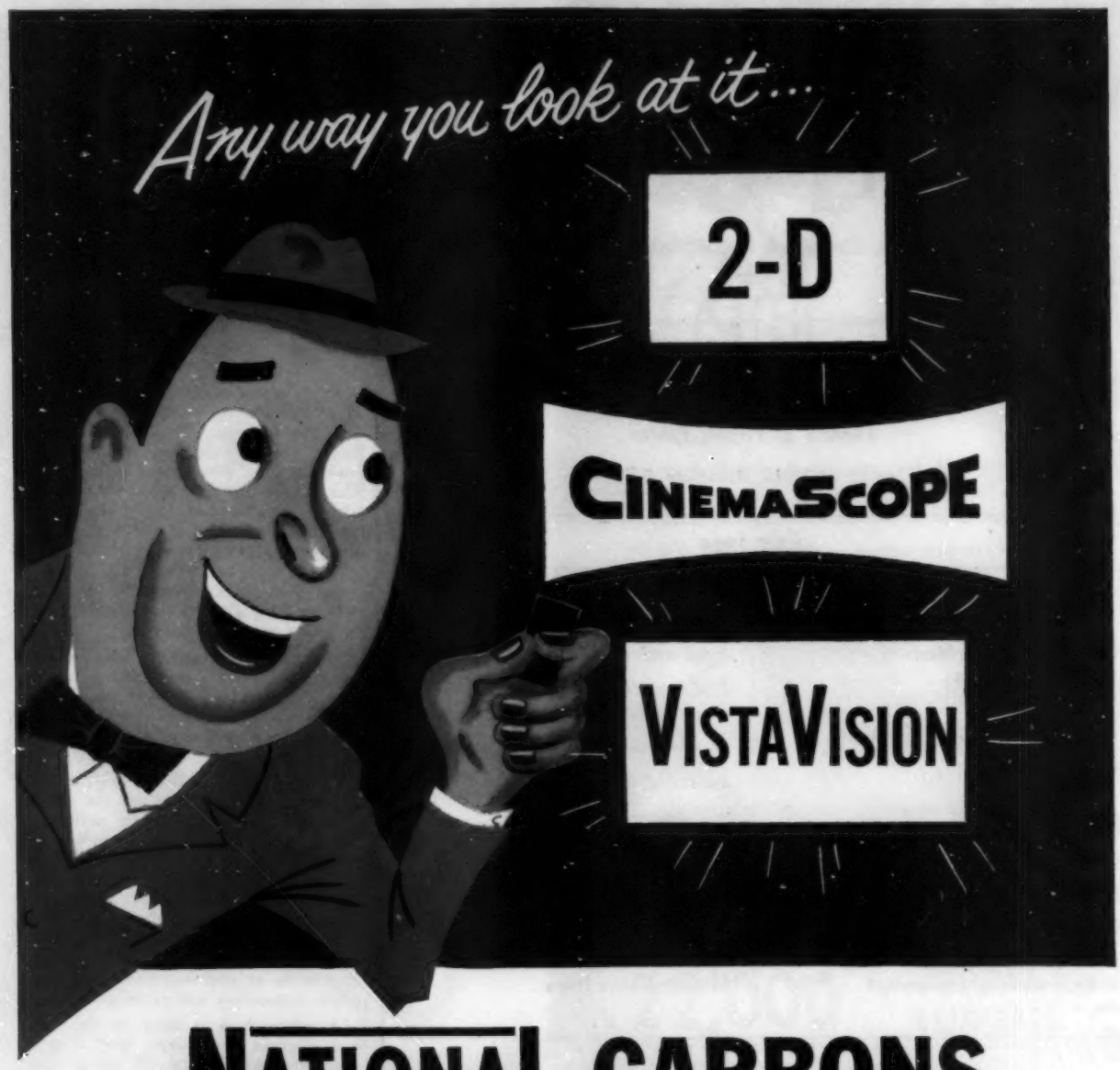
Great technical skill and wide experience is required to carry out the diverse assignments which IA men undertake. And as the fields of video and audio entertainment develop apace, it is to be expected that IA members will increasingly fit themselves by study and experimentation to carry out their part in the further development of such fields. Television broadcasting is an industry destined to be an ever-increasing agency of public instruction and entertainment.

IA members now have at the same time a great opportunity and a great responsibility to learn all about their field of endeavor, to keep up to date and to foresee the future and be prepared for it. It is their opportunity to be indispensable workers and leaders in the existing and new fields. And it is their opportunity to make the public feel, concerning the IA membership, that never have so many people owed so much entertainment and so many interesting hours to such an unsung group of skilled workers.

Secure in the knowledge of the valuable services they perform, the men of the IA who gather now for their 42nd convention look into the future with confidence because they know that their skill and the valuable experience they have acquired is recognized and respected by everyone in the entertainment world.

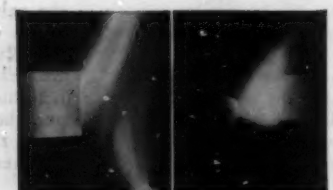
The foregoing is in itself not only sufficient justification but actually a mandate for the publication of the Special IA Convention section of this regular monthly issue of IP.

Any way you look at it...



NATIONAL CARBONS
TRADE-MARK

Are the best ever made!



THE PICTURE IS LIGHT...
GIVE IT ALL YOU CAN
with "NATIONAL" CARBONS

Whatever projection techniques you use, the present line of "National" carbons is the finest ever offered – by ourselves or any other manufacturer.

Not only do they excel in brilliance, color-balance and uniformity, but they give you all these features at the lowest cost per unit of light and inch of carbon consumed!

Such a small part of operating expense . . . such a *big* part of picture quality –"National" carbons always do their part in giving *you* full value for every dollar . . . your *patrons* full value for each admission.

The term "National" is a registered trade-mark of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY

A Division of Union Carbide and Carbon Corporation • 30 East 42nd Street, New York 17, N.Y.

District Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

IN CANADA: Union Carbide Canada Limited, Toronto

INTERNATIONAL PROJECTIONIST

VOLUME XXIX JULY 1954 NUMBER 7

Evolution of the Modern Projection Lens

A detailed but easily understood explanation of the origin and development of the highly-corrected, six-element lens now used in projection is given. Problems that have confronted designers of lenses, and the methods employed in solving them are described herein.

By ROBERT A. MITCHELL

NOT until the eleventh century —the era of the Magna Carta and Genghis Khan—were lenses of a simple type readily obtainable. In the Thirteenth Century lenses were used as spectacles, one of their first practical applications. But if the early European spectacle-makers thought their invention very modern, it was because they didn't know what had been going on in China since ancient times. Nevertheless, even the Chinese had to go without bifocals until Ben Franklin invented them.

On the scientific side, lenses were brought together to make a microscope in 1590 (Janssen) and a telescope in 1609 (Galileo). Not many years later the image-forming properties of lenses became better known, and the "magic lantern" was devised. The invention of this picture-projecting apparatus is usually credited to Anathasius Kircher, who made one having both condensing and projection lenses in 1671.

Kircher's "Magic Lantern"

It's a far cry from Kircher's magic lantern to the modern motion picture projector fitted out for stereophonic sound and CinemaScope. But Kircher's lantern and hand-painted slides of angels in nightshirts *did* start the ball rolling; and when practical photography came into being (about 100 years ago), the magic lantern assumed the dignified name of "stereopticon" and was used as an instrument of show business.

Motiograph, Inc., now occupied with the manufacture of the very latest projection, sound, and theatre-Tv equipment, began its long and continuous career in 1896 when it made an "entertainment outfit" consisting of a magic lantern, several sets of slides, and a supply of advertising posters and admission tickets!

The Single-Element Lens

At this point let's direct attention to the little disks of curved glass that made this primitive kind of show business possible—the lenses which project pictures on the screen in highly magnified form.

A simple magnifying lens can be bought at almost any dime-store for a few cents. Such a lens, comprising only one circular piece of glass having bulging (convex) sides, is called a *positive* lens. Positive lenses have the power to converge rays of light to a focus, and thus are able to form an image on the film of a camera or the screen of a movie theatre.

A motion picture can thus be projected with a dime-store magnifying glass, but the screen image so obtained will win no "Oscars" for quality! For clearer pictures on the screen we must use a better, more expensive lens.

When astronomical telescopes first came into use, simple single-element lenses resembling dime-store magnifying glasses were employed to form the images of distant objects. The images of the sun and moon, and the planets and stars definitely lacked image-quality. One of the most serious things the matter with them was the presence of rainbow-colored fringes at the edges of every object. This defect is known as "chromatic aberration."

Isaac Newton's Error

Sir Isaac Newton was a great scientist, but like the rest of us he pulled "boners" occasionally. A famous one was his belief that chromatic aberration was utterly incurable. Feeling certain that nothing could be done to get rid of the blurry colored fringes, he devoted his attention to reflecting telescopes which, having

mirrors instead of lenses, were free from chromatic aberration.

About 30 years after Newton's death, however, a startling discovery made by John Dollond revived interest in refracting, or lens-type telescopes. If a plano-concave lens of flint glass be placed in conjunction with a bi-convex lens of crown glass, Dollond demonstrated, the different dispersion characteristics of the two kinds of glass would almost wholly neutralize chromatic aberration.

And thus in 1758 the *achromatic doublet* was born, and the history of scientific lens-making began. From that time on, optical designing became a specialized art, and lens manufacturers began the quest for new and better optical glasses for lens-making.

The next great revolution in the optical art came about in 1886 when the Jena Glass Works of Germany announced the discovery of 19 new types of glass for lenses. This was followed by 24 other new glasses in 1888 and 8 more in 1892. Modern projection lenses are made possible by the heavy barium-crown glasses discovered at Jena.

The Color-Corrected Lens

Now, then, we may discard our dime-store magnifier and try a Dollond achromat—two single lenses of crown and flint cemented together with resin—in a motion-picture projector. A very great improvement will be noticed, and yet the screen image still leaves much to be desired. Even though free from color-blurring, the simple achromat is afflicted with spherical aberration, field-curvature, coma, and other distortions such as "astigmatism."

Spherical aberration is caused by the outer zones of the lens having a slightly shorter focal length than the central regions. This aberration produces a "soft-focus" effect by covering bright objects in the image with a luminous haze.

Field-curvature is present when either the middle or the edge-areas of the projected image can be focused sharply, but not both areas at the same time. A lens afflicted with field-curvature is unable to give the flat field desired in projection lenses.

Coma is a stubborn blurriness of the edge-areas of the projected picture. This defect is easily distinguished from field-curvature, for coma makes it impossible to obtain a sharp focus in the edge-areas.

Astigmatism is a peculiar distortion of the configuration of image-points. It is best illustrated by the image of a spoked wheel. When astigmatism is present, one focus-position of the lens will produce sharp images of the spokes (radial lines) but not of the circular hub and rim. When the lens is refocused to image the hub and rim clearly, the spokes go out of focus.

Some Lens-Design Problems

Some of these exasperating aberrations could be eliminated by proper designing of our simple achromatic lens. By "figuring" the lens surfaces to special curves difficult to obtain in practice, spherical aberration could be removed. By "bending" the lens to a meniscus, or crescent form, a few of the other aberrations could be eliminated. While the forms of lenses are frequently "bent" in commercial lens-manufacture, only spherical curvatures are practicable.

It is obvious that we shall have to find a better lens than a simple achromat in order to obtain a clearer, crisper picture on the screen. And a satisfactory projection lens, when we find it, will be a *compound lens* consisting of two or more lens-elements mounted in a tube, or lens-barrel. Moreover, the lens should be large enough to intercept and send to the screen all, or nearly all, of the light that passes through the film-photograph in the aperture. We therefore require a "fast" lens, and since accurate lenses of large diameter are difficult to manufacture, we must expect a really satisfactory projection lens to cost several hundred dollars.

The Petzval Design

Lenses suitable for projection did not exist before 1840. That was the year that Joseph Petzval, an Austrian scientist, designed the first practical compound lens for photography and projection—big and fast and free from most of the troublesome aberrations of simple lenses.

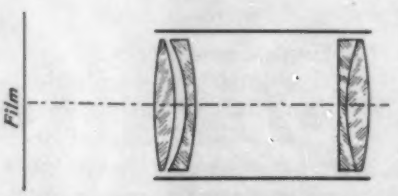


FIG. 1. The Petzval aplanat is the most commonly used projection lens. Its chief failing is its small angular field of good definition, making it unsuitable for short-focus lenses, which must cover a wide field.

The "Petzval doublet," or *aplanat*, as this lens is called, is shown in cross-section in Fig. 1. Doesn't it look familiar? If the lenses in *your* projectors are not of the very latest type, they are undoubtedly Petzval aplanats. As a matter of fact, this type of lens has been the standard for motion picture projection ever since the Lumiere brothers first turned the crank of their Cinematographe in the autumn of 1894. Better types of projection lenses did not appear until about 15 years ago.

In most makes of projection aplanats, the two lenses of the front element are cemented together with Canada balsam (the refined pitch of the fir tree) or with synthetic resin, but the two lenses of the rear element (nearest the film) are usually separated by a small air-space.

Among the most widely used makes of Petzvals we find the Zeiss Kinostar and Kipronar, the Busch Neokino, the older Ross, and the older Kollmorgen Snaplite and Bausch & Lomb Cinephor.

There are, of course, many minor variations in the design and construction of these different lenses. For this reason they vary widely in quality.

Limitations of Petzval Type

Now, even though a well-designed, well-made Petzval performs very well indeed, it has a serious shortcoming that shows up in the shorter focal lengths—particularly when the E.F. (equivalent focus) is shorter than 4 inches. The angular field which Petzval aplanats cover with good image-definition is only from 12 to 15 degrees. Outside of this small area of good definition the image suffers from coma (unfocusable blur) and heavy field-curvature.

Extremely sharp focus in the edge-areas of the picture is therefore practically impossible with an aplanatic lens having a focal length shorter than about 4½ inches. But with focal lengths of 4½ inches and longer, the aplanat has the advantage of extremely sharp definition even when the lens has a very large diameter.

In 1890 two German scientists, Abbe and Schotte, widened the angular field with a new type of lens construction called the *anastigmat*.

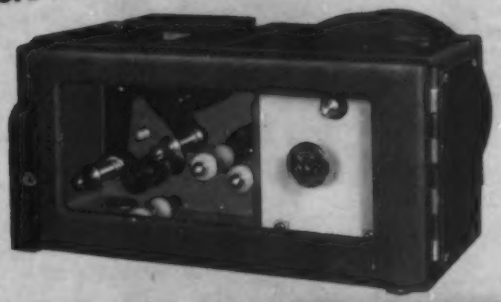
(Continued on page 18)

Easiest way

to show biggest

box-office films...

RCA's "BUTTON-ON" MAGNETIC SOUNDHEAD



Sound boomed box office

...in 1927, on discs

...in 1928, on optical track!

And now it's time to build up box office at your drive-in with all the cash-pulling attraction of wide screen and magnetic sound! Do it the easy inexpensive way... with the famous RCA "Button-On" Soundhead that handles single or multiple magnetic tracks.

Thanks to RCA's high engineering standards, the "Button-On" Soundhead reproduces magnetic sound as it was meant to be heard... catching even on single track the fidelity, the clarity, the naturalness that are typical of magnetic sound. RCA's exclusive soft-loop system means flutter-free sound, with irregularities filtered out. Actual performance has proved the MU-metal shield keeps out extraneous noises, assures exact soundtrack reproduction.

Every day you put off conversion, your drive-in or your house is missing out on showing the biggest, most profitable feature attractions you can book. That's why it's just plain good business sense to call your RCA Theatre Supply Dealer today... about your RCA "Button-On" Soundhead!

THEATRE EQUIPMENT

RADIO CORPORATION of AMERICA

ENGINEERING PRODUCTS DIVISION CAMDEN, N.J.

In Canada: RCA VICTOR COMPANY, Limited, Montreal

Maintenance of Sound Quality With Magnetic Pickup Heads

By EDWARD STANKO

Manager, Engineering Section, RCA Service Co.

ONE of the most important units of four-track stereophonic sound reproducing systems is the magnetic pick-up cluster. This unit is the heart of the system and corresponds to the optical lens and phototube of a standard 35-mm sound reproducing system. There is, however, one main difference between the two pick-up systems in that the surfaces of the magnetic pickup head are subject to wear from the oxide on the soundtracks.

Various methods of reducing the wear of the pickup surfaces have been used. Probably the best method used so far has been the use of a "soft loop" such as has been incorporated in the RCA soundhead. This reduces the friction between the pickup head surfaces and the soundtrack oxide so that minimum wear occurs.

Firm Contact Imperative

For good sound reproduction, all of the magnetic tracks should make a firm contact with the pickup head surfaces. In some instances, one or more of the pickup surfaces wears more than the others, causing a dropping off in sound level. If the pickup surfaces have worn down unevenly, and there is still sufficient metal left, it may be possible to have the surfaces relapped at the factory. Before this is done, the projectionist should consult with his service engineer to see if such a procedure is advisable.

Occasionally, foreign substances become deposited on the magnetic pickup head surfaces. Cleaning the surfaces is minor, but very important, routine procedure for the projectionist. Some heads can be cleaned with ordinary carbon tetrachloride, while others should be cleaned with alcohol, depending upon the kind of potting compound that has been poured around the cluster coils.

To be on the safe side, ask your service engineer for the proper type of cleaning fluid to be used on a particular pickup head.

Occasionally, also, some of the metal parts comprising the pickup become magnetized. Where this has occurred, it is necessary to demagnetize the parts to obtain satisfactory performance. This procedure can be carried out as described in a special article on degaussing which appeared in the March 1954 issue of IP. *

'Grounded' or Open Coil

If all of the amplifier channels are operating normally and severe hum is being picked up on only one of the channels, the trouble will usually be caused by a grounded or open pickup coil. Because the entire pickup coil cluster is usually enclosed and potted, the quickest way of correcting this condition is to replace the entire assembly.

If difficulty has been experienced with the quality of sound reproduction, a careful inspection should be made to see that the film is properly contacting the pickup head surfaces. Sometimes the head surfaces wear down so that the film rides on one or more of the shield separators that are placed between the pickup sections. If one of these separators, or the potting compound between the clusters, is higher than the surface of the pickup head, it will prevent the film from contacting the pickup surface, causing loss of sound level and possible distortion.

When the pickup surfaces have been worn down to a point where the surfaces are practically flat and there is insufficient metal left for relapping, the entire cluster must be replaced.

It would be a happy circumstance if sufficient questions anent the operation and maintenance of magnetic sound reproducing heads could be obtained from projectionists to provide the basis for a symposium thereon.

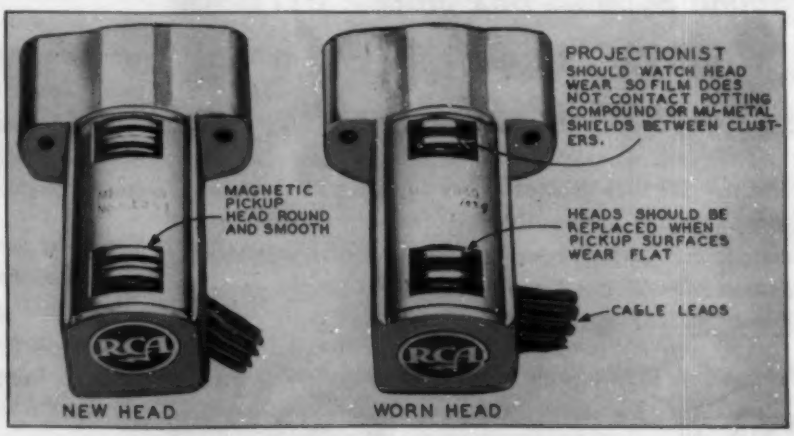
[ED.'s NOTE: IP enthusiastically approves of the suggestion advanced in the paragraph immediately preceding and would open its columns wide therefor, irrespective of space demands.]

* "Simple 'Degaussing' Procedure Protects Magnetic Tracks," by Edward Stanko, p. 10.

McKenna Upped to RCA Top Theatre Post

George L. McKenna has been appointed Manager of the Theatre and Industrial Marketing Department, Engineering Products Division, of RCA. He succeeds Barton Kreuzer, who has been advanced to Director of Product Planning.

Mr. McKenna, who joined RCA in 1945, has served for the past year as Manager of Operations Planning for the division. Previously, he was special assistant to the vice-president and general manager, and was sales manager of industrial products. As marketing manager for RCA theatre and industrial equipment, he will be responsible for the product planning, marketing, and sales of RCA theatre products, industrial and scientific instruments, sound and visual equipment, film recording apparatus, "Tv Eye" closed-circuit systems, tape recorders, and "hi-fi" sound components.


PROJECTIONIST SHOULD WATCH HEAD WEAR SO FILM DOES NOT CONTACT POTTING COMPOUND OR MU-METAL SHIELDS BETWEEN CLUSTERS.
MAGNETIC PICKUP HEAD ROUND AND SMOOTH
HEADS SHOULD BE REPLACED WHEN PICKUP SURFACES WEAR FLAT
CABLE LEADS
RCA
RCA
NEW HEAD
WORN HEAD

Graphic representations of new and old magnetic reproducer heads, directing projectionist attention to vital points of wear thereon.

For Best Projection of

CINEMASCOPE

NATIONAL EXCELITE "135" PROJECTION ARC LAMPS

For Huge Drive-In Screens

National's new Reflect-O-Heat Unit permits a great increase in volume of light at the screen without a corresponding increase in heat at the aperture.

●

For Presenting 3-D

The Excelite "135" delivers the necessary increased volume of light and also the extended running time required on a single trim.

●

The color value and intensity of the light at the screen is maintained constant throughout a full trim without manual adjustment by an automatic arc crater positioner.

Distributed by

NATIONAL THEATRE SUPPLY

Division of National • Simplex • Blumenthal Inc.

"THERE'S A BRANCH NEAR YOU"

New Light On The Past

By FREDERICK GOOCH
Member since 1913 of IA Local 224, Washington, D. C.

During a recent round-table gab-fest (inevitable when projectionists gather) there arose a question relative to the series of articles "Heart of a Projector Mechanism," which Robert A. Mitchell contributed to IP for July, August, and September, 1952. These discussions induced the appended commentary. This is of historical import because it is first publication anywhere of the correspondence between Thomas E. Edison and Thomas Armat. Significantly, both Messrs. Edison and Armat are on the Honor Roll of the SMPTE for their vital contributions to the development of motion pictures.

I ENJOYED reading Robert A. Mitchell's article, "Heart of the Projector Mechanism," printed in the July, August and September issues of IP for 1952. However, I take issue with him on several points.

For many years I had known C. F. Jenkins and Thomas Armat, and had often discussed patents and mechanisms with either of them at separate times. To this writer, C. F. Jenkins was a brilliant man but he could never seem to get out of the experimental stage. He never got away from applying the beater-movement to motion pictures. This movement was not of any use for projection purposes.

Still, in 1909 he designed a 35-mm camera with this same beater-movement. Several years later he designed a projector called the "Graphascope," which had the Geneva movement, a very poorly designed machine, which had no commercial success. I presented one of these projectors to the Smithsonian Institute, along with several others to be used for exhibition purposes. In no way, please understand, am I trying to belittle Mr. Jenkins. I valued his friendship.

Armat's Ideas Adopted

Thomas A. Edison was another experimenter who never produced a practical projector until Thomas Armat came on the scene. Edison then admitted defeat and dropped all of his experiments and adopted Armat's methods. For proof of this statement see the accompanying photo of a letter sent by Edison to Armat. When Mr. Armat gave me this photographed letter it was promised that I was never to show it as long as he lived. I don't know of anyone else having a copy of this photo, and I think it should be published.

In February, 1937 Local 224 (Washington, D. C.) of which I am and have been a member since 1913, held an anniversary banquet. Our committee contacted Mr. Armat, asking for a brief history of his participation in the early days of motion pictures. His reply was as follows;

Washington Showing in 1895

"Responding to your request for a brief statement of my part in the invention and development of the first successful moving picture projecting machine, the first exhibition of moving pictures on a screen that embodied any of the features of present-day movies was given by me in my office at 1313 F Street, Washington, in August, 1895. This machine was the result of several months of experimental work directed and financed by me.

"Associated with me in the production of this machine during these months was the late C. F. Jenkins, and on August 28 we applied for the joint patent on the machine which later issued as U. S. Patent No. 586,953.

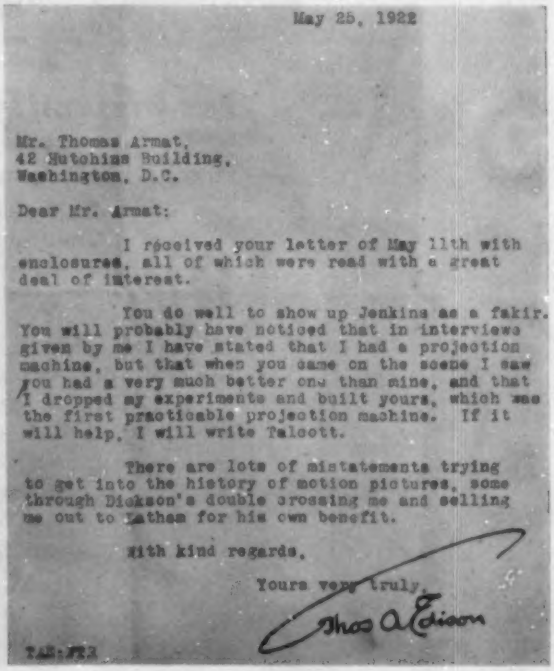
"This patent covered the feature of making the period of illumination of each picture exceed the period of obstruction, or shift, but the intermittent mechanism for accomplishing this was a complete and incurable failure and the machine was abandoned after a few exhibitions in my office.

The First Practical Projector?

"Shortly after this I developed a practical machine with an entirely different intermittent mechanism and other improvements, including the important one of providing a pre-determined amount of slack in the film. This machine I christened the "Vitascope", and is shown in my patent No. 673,992 filed on February 19, 1896.

With this machine I gave the first motion picture exhibition ever given in a theatre, in Koster and Bial's Music Hall, New York in April, 1896.

"Subsequent to this I developed a



May 25, 1922

Mr. Thomas Armat,
42 Hutchins Building,
Washington, D.C.

Dear Mr. Armat:

I received your letter of May 11th with enclosures, all of which were read with a great deal of interest.

You do well to show up Jenkins as a fakir. You will probably have noticed that in interviews given by me I have stated that I had a projection machine, but that when you came on the scene I saw you had a very much better one than mine, and that I dropped my experiments and built yours, which was the first practicable projection machine. If it will help, I will write Talcott.

There are lots of misstatements trying to get into the history of motion pictures, some through Dickson's double crossing me and selling me out to Latham for his own benefit.

With kind regards,

Yours very truly,

Thos A. Edison

TAE:FH

This letter from Thomas A. Edison to Thomas Armat is the first reproduction ever published and as such is of historical import. The statements in this letter, over Edison's signature, go far to refute the long-standing opinion of motion picture people as to Edison's contribution to the motion picture projection art.

still different, and a much better, intermittent mechanism, which gave the film gradually accelerated stop-and-start movement that reduced the wear on the film and the vibration of the picture on the screen.

Patents on File

"Application for patent covering this mechanism, known as the star-wheel intermittent was filed on September 25, 1896, and later was issued as Patent No. 578,185. The mechanism of this intermittent was immediately adopted to the exclusion of practically all others in the early days, and is still the preferred intermittent for use in theatres, so I am told.

"All of these patents, are, of course, matters of record in the U. S. Patent Office where copies may be obtained. It may interest you to know that I never sold or authorized the sale of a machine, relying instead upon royalties as a source of profit on my inventions.

Patent Delays, Litigation

"Delays in the issue of patents and subsequent litigation resulted in the manufacture and sale of a flood of unauthorized machines, all of them infringing one or more of my patents and most of them infringing all of them. I helped to organize the Motion Picture Patents Co., composed of the Edison, the Biograph, and my own company.

"These royalties, while small individually and easily met by the industry, amounted in aggregate to a very substantial and satisfactory net income."

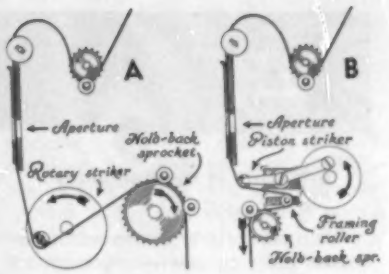


FIG. 1. The striker movement—it struck many a nickel into the coffers of the old-time nickelodeon. Rough on film and on the eyes of the audience, both the "dog" striker in A and the "piston" beater in B jiggled many a celluloid romance to its happy conclusion. The pull-down sprockets revolved at constant speed.

To Which Mr. Mitchell Replies:

On what points does Frederick Gooch take issue with me? After careful study of the interesting material submitted by Mr. Gooch, I am unable to discover any serious disagreement with the brief historical resume given in my article "Heart of the Projector Mechanism" in IP for August 1952, page 8.

Perhaps I may be criticized for failing to mention that Edison's projection Kinetoscope was basically the third Armat machine.

Armat, Lumiere Showings

Also, I did not mention Thomas Armat's exhibition of Edison films on a screen in his office in August 1895. Neither did I mention the private projections of movies with the Lumiere Cinematographe early in the autumn of 1894. Of the two showings, the Lumiere exhibition must surely be considered the more important, since they made their own films, and their screen results were far superior to Armat's.

In view of the Lumiere brothers' precedence in the field, I should take issue with Armat's statement that his August 1895 showing was "the first exhibition of moving pictures on a screen that embodied any of the features of present-day movies." It cannot even be argued that Armat's first projector (built in collaboration with Francis Jenkins) had an intermittent movement similar to the Geneva movements of the present time. His first machine had a Geneva-type movement, but the star-wheel had 14 slots! The large mass of this star-wheel, combined with that of the 56-tooth intermittent sprocket, prevented smooth, rock-steady operation.

Lumiere Claw Movement

The simple claw movement of the Lumiere Cinematographe camera-projector (still used in many professional motion-picture cameras) functioned perfectly.

Armat himself admits that his first Geneva-type intermittent movement "was a complete and incurable failure; and the machine was abandoned after a few exhibitions in my office." The familiar Geneva intermittent having a star-wheel with 4 slots was first used in a projector built by O. Messter in 1896.

The Kinetoscope

The name Kinetoscope was first applied by Thomas Edison to his peep-hole moving-picture machine which exhibited the 48-frames-per-second films photographed by his Kinetograph camera. To Edison goes the undisputed honor of having invented the motion-picture camera and the 35-mm film designed with 4 perforations per frame on each side.

With the exception of the speed of the film, Edison's film-standards are still in use, and probably always will be for professional movies, notwithstanding Todd A-O and other wide-film processes. Most exhibitors have already turned thumbs down on off-standard film-widths.

It was not until Edison had met Armat and made a deal to manufacture Armat's Vitascope projector was the name "Kinetoscope" applied to anything but the great inventor's lucrative peep-show machine.

From 1894 to 1897 Edison did everything possible to discourage the building and use of motion-picture projectors. At first the great inventor claimed that the projection of moving pictures was impractical. Perhaps he actually believed that, just as, later, even when the principle of the vacuum-tube lay within his grasp, he declared radio to be unfeasible if not utterly impossible.

It must be kept in mind, however, that the Wizard of Menlo Park was no slouch in matters of quick dough. His peep-show concessions were bringing in floods of nickels. Why plug the profitable peep-hole by *projecting* the pictures?

Motion Picture Patents Co.

Edison's frequent threats to sue everyone who as much as thought of projecting motion pictures (especially if they had it in mind to project Kinetograph films) gained volume, if not force, by the appearance of Thomas Armat and his sale to Edison of the rights to his second projector. The sound and fury of impending litigations were not entirely quelled, even if ignored by the courts, until the demise of the old Edison-Biograph-Armat equipment monopoly known as the Motion Picture Patents Co. Meantime, internecine strife at the Edison

(Continued on page 25)

Ingenuity in the Antipodes

To the Editor of IP:

I was particularly interested in the question posed by Lawrence Johnson, of the Aggie Theatre, Stillwater, Okla., in a recent "What's Your Problem" column of IP (March 1954). I had similar trouble using 1-kilowatt lamps, although they were not connected to the theatre ventilating system.

Noting the British Arcvent featured in IP some time ago (March 1954), I made inquiries but found that this unit was not available in this country (Australia). I then discovered that war surplus disposal stores were selling an ideal substitute — a blower unit taking 26 volts D.C. at 1½ amps used originally for cooling transmitter power tubes, and priced at 3 pounds, 10 shillings (approx. $9).

It had mounting brackets ready for use on top of the lamphouse. I wired it (fused) to the arclamp circuit so that it functioned when the arc switch was closed to bring the arc into operation. This method has been quite satisfactory, the units now having been in use for a year, doing a good job. Similar units must be available at war disposal stores in the U.S.A. and other countries.

Your publication is "tops" with us, and we are grateful for the candid and honest comments on the latest trends. Although every industry must progress, the lack of standardization is very unwise indeed.

REGINALD A. STEWART
Plaza Theatre, Wangaratta,
Victoria, Australia

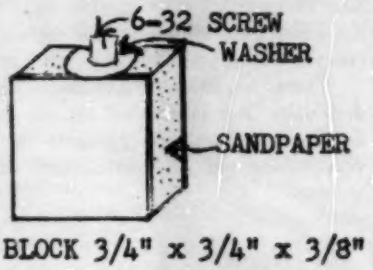
Film Scraping Sandpaper Block

Letters to the Editor:

Anent R. J. Fisher's letter in IP for May (p. 23) where he describes the wooden sandpaper block for scraping film in preparation for splicing. I have used for some little time a sandpaper block which I think is superior to the Fisher unit, as the sandpaper is replaceable without the use of glue.

The accompanying drawing shows its construction: it is made of aluminum ¾ x ¾ x ⅜ inch thick. On one of its edges a hole is drilled and tapped for a 6-32 machine screw. A strip of sandpaper just the width of the block is wrapped around the edges, with the end extending under the washer as shown. When the screw is tightened, the sandpaper will stay in place without glue, thus making it very easy to replace the abrasive when it is worn.

The abrasive on three edges of the block is usable, with each edge being wide enough to give two cutting surfaces, making six surfaces to be used prior to replacement. I recommend a fine grade of waterproof sandpaper, being much superior in cutting quality and lasting much longer.



Diagrammatic representation of Jackson CinemaScope film scraper.

Any projectionist can make this unit if they find a bit of the right aluminum of the right dimensions. For those who cannot make their own, I will gladly send them one *free of charge*. Simply drop me a line requesting one, *but* enclose ten or fifteen cents to cover mailing cost. Being the manufacturer of Jackson Reel End Signals, thus have a goodly supply of aluminum on hand.

I haven't yet been confronted with splicing CinemaScope film, but I heartily endorse the comments made by Mr. Fisher.

J. G. JACKSON
8 Mar St., Port Alberni, B. C., Canada

What's Your Problem?

QUESTION. *Here's a problem in 3-D projection that I do not believe has received sufficient attention. I have found that, for maximum effectiveness, projector port filters should be adjusted in a manner that guarantees that the reflected light from the screen is properly polarized. It is not enough to level the filter mounts then—and trust to luck.*

Is the following right or wrong? I suspect that steep projection angles cause the reflected light from the screen to have a changed polarity from that of the incident light. To establish this for yourself level your projection filters, start either machine, and throw a reduced light on the screen. While the machine is running, go over and look through the other leveled filter toward the screen and notice that the reflected light is not blacked out. Loosen the filter you are looking through, and you will be able to blackout the light by rotating it somewhat. You will then notice that the filter is not level with the other. For this test use only enough light to ascertain blackout point and have the filter cooling blower in operation.

It is also true that there are slight manufacturing errors in some filters so that the lines of polarization are not always at the proper angle to the mounting frame; result: the filters cannot be accurately positioned merely by leveling the frames with a spirit level.

EARL W. ANDERSON
Hill Theatre, Hillsboro, Oregon

ANSWER. According to John A. Norling, pioneer in the development of stereoscopic motion pictures, you are incorrect in suspecting that there is a noticeable change in the lines of polarization of reflected light when the projection beam strikes the screen at a sharp angle. It is more probable that the light you noticed passing through the filter, when there should have been a complete blackout, got through as a result of a defect in the filters, as you noted in your letter.

Not every pair of filters is so efficient as to adequately control the light striking them, and not all are mounted so accurately that the lines of polarization will be at right angles when the filters are leveled. Mr. Norling states that a 5% deviation will cause ghosting.

New Altec Lansing Speakers

Altec Lansing Corp. is now offering two newly-designed models of its "Voice of the Theatre" loudspeaker units, bringing the total number of models to nine. These new loudspeaker systems, coded A-6 and A-7, replace the Model 800 previously made for small theatres.

There is a two-fold reason for the development of these new systems, according to Altec: the higher requirements of stereophonic sound reproduction and the increased need for lower-priced sound systems in smaller theatres. The new design is said to provide not only extended bass and high-frequency reproduction but a smoother overall frequency response. The A-7 is priced at $260; the A-6 at $425.

30,000,000 Tv sets Operating

The number of Tv sets installed in the U. S. has passed the 30,000,000 mark, according to the research department of National Broadcasting Co., an increase of 6,000,000 over May 1 of last year.

New Westrex Sound Reproducing Equipment

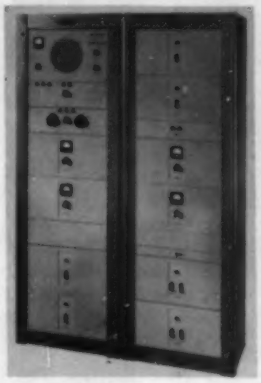
THE Westrex Corp. complete new line of theatre sound reproducing equipment is designed to meet the present demand for higher-fidelity sound. The new systems include both multi-channel models, either for magnetic or optical reproduction. Among the featured components of the new systems are:

The Westrex R9 stereophonic reproducer, operable on any modern projector to reproduce magnetic sound tracks, has a very low mechanical flutter content, made possible by its hydro-flutter suppressor, which won an Academy Award, plus a tight film loop and double flywheels.

In theatres already equipped for multi-channel magnetic sound, an additional unit, the Perspecta sound integrator, is available for stereophonic reproduction from a single optical track. The integrator senses control frequencies recorded on the track below the level of audibility, and moves the apparent source of sound back and forth across the screen by varying the volume to the three speakers. The integrator is connected between the soundhead and the power amplifier.

Noteworthy New Features

The Westrex R7 photographic sound reproducer features for the first time special timing belts, used in all high-quality studio recording systems, which do not slip or stretch and are noiseless. The R7 has a longer optical path and the "Equilight Diffuser." The latter is a special part of the Westrex lens system which spreads the light equally over all the sensitive surface of the photo-electric cell and provides a minimum of distortion from variable area recording and the best possible response from any type of recording. All shafts are mounted on ball bearings.



Westrex sound systems 36 and 37 amplifiers cabinets (front view) provide up to four channels for magnetic or photographs reproduction. The full - length rear doors and removable front panels are featured servicing aids.

The T454 power amplifier, with a new circuit and specially wound coils delivers more output with less distortion and using less current from standard vacuum tubes than any previous 50-watt amplifier.

Westrex T604A pre-amplifiers are designed to provide the higher gain and greater quietness required in pre-amplifiers reproducing magnetic sound. The Westrex 33 cabinet assembly includes a muting amplifier for auditorium speaker control, in addition to four magnetic pre-amplifiers.

Unique Switching Facilities

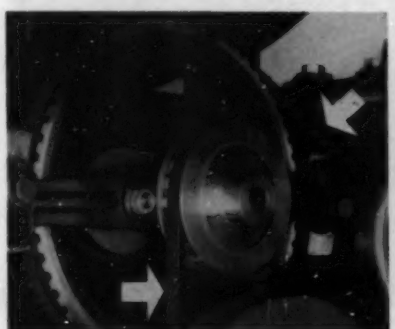
The Westrex 36 and 37 cabinets, six feet high, provide for 3 or 4-channel magnetic and switching facilities. These unique facilities make it possible to reproduce through three speakers or, if one channel fails, through the other two channels; or, if desired, through one channel. The C36 cabinet also provides a volume indicator which can be switched to any of the channels to assure proper balance between channels. Servicing is done from in front of the cabinet; space is provided for possible future additions.

Completely redesigned for increased efficiency under the exacting requirements of multi-channel sound are the new Westrex high- and low-frequency speaker units and associated baffles.

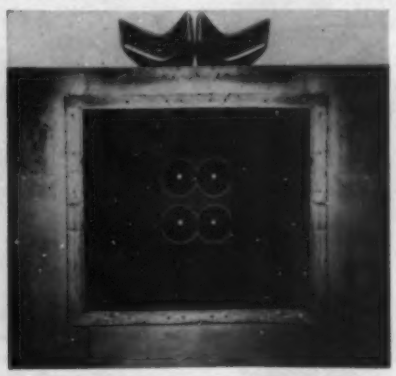
An outstanding feature of the new Westrex speaker equipment is the replacement of the multi-cellular horn formerly used in connection with high-frequency units by the Westrex "acoustic lens," which assures an even distribution of sound throughout an auditorium and an absolute minimum of interference pattern. The principle of this lens has its roots in the need for *uniform* distribution of high frequencies over the required angle of auditorium coverage.

This involves the use of a type of structure which refracts and focuses sound waves and which is similar in function to certain electromagnetic wave-lengths in that it consists of arrays of obstacles which are small compared with the wave-lengths involved.

The Westrex T501A loudspeaker assembly for smaller theatres features the high-frequency "acoustic lens". Shown here is a 50° lens.



Westrex R7 photographic reproducer (rear view, cover removed) showing special noiseless timing belts that neither slip nor stretch, which are featured for the first time.



Westrex T502B stage loudspeaker assembly for larger theatres features the high-frequency acoustic lens. Shown here are two 80° lenses.

Tinted Car Glass in Drive-Ins

Use of tinted glass for automobile windshields is increasing despite protests from the drive-in industry that such glass interferes with the enjoyment of outdoor movies. About 60% of new cars now coming off assembly lines have tinted windshields and windows compared with 50% a year ago.

The Automobile Manufacturers Association regards the fears of outdoor theatre owners as groundless, claiming that the tint has only a minor effect on visability. However, the auto industry is said to expect a continued demand for clear glass, and the tinted windshields are expected to remain an optional accessory rather than standard.

IN THE

SPOTLIGHT

MORE THAN 300 members of the Association of Documentary and Television Film Craftsmen engaged at independent studios in the New York City area have voted to disaffiliate from the National Association of Broadcast Employes and Technicians (NABET), a CIO unit, and to dissolve so that its members may join the IATSE.

Culminating more than a year of strenuous effort by the East Coast Motion Picture Studio Council, headed by John J. Francavilla, IA representative, this development constitutes a signal victory for the IA and a severe setback to NABET, which has been waging a bitter jurisdictional war with IA over radio-Tv studio workers.

That the arrangement will be finalized was obvious when NABET made the forlorn gesture of revoking its affiliate's charter. IA officials state that the acquisition of these new members will go a long way toward bringing all film production employes under one union banner — the I.A.T.S.E.

These former ADTFC members will be taken into the IA Radio and Television Department and will be obligated by the respective Locals to which they will be assigned, namely: Cameramen's Local 644, Studio Mechanics Local 52, Editors and Cutters Local 771, Assistant Directors Local 161, and Make-Up and Hair Stylists 798.

Organized in 1952, the Studio Council, headed by Francavilla, has been hard at work trying to eliminate dual unionism in the studios and to sign basic agreements with all independent film producers in the New York area. The rapidly mounting use of film for Tv programs has increased this type of work manifold.

ADD: Just as this issue of IP went to press came the news of another sweeping victory for the IA over NABET when, following a Canada Labor Relations Board election, won by the IA 137 to 43, all Tv production employes of Canadian Broadcasting Corp. also went under IA contract.

Result: wage increases of at least 8% (much more in some cases) for more than 300 Tv production workers in Toronto, Montreal, Ottawa, Vancouver, and Winnipeg. Ditto for future CBS outlets such as Halifax, which goes on the air shortly.

Negotiations were spearheaded by Hugh Sedgwick, IA Canadian vice-president, and provide for retroactive raises to February 1 last. Production group includes carpenters, electricians, propertymen, costumers, make-up artists, film cameramen, film editors, cutters, librarians, designers, coordinators, titling artists, script assistants, casting clerks, floor managers (sets) and others—all now members of IA Radio and Tv Department.

Because so many different crafts are involved, the new contract is quite voluminous and complex. For CBC "regular-establishment" employes (those eligible for pensions), it reduces the work week from six days to five. For so-called "casual employes" (now reconstituted as "Tv crafts establishment") it sets up a five-day, 40-hour week, with three weeks vacation and 18 days sick leave per year. For employes having individual contracts, it fixes minimum scales, helpful to set designers and cameramen when their present agreements expire.

• "Never say die" is a motto that paid off for the members of Local 677,

25-30 CLUB OF N. Y. HONORS PAUL REISS, NATIONAL CARBON, AND CHARLEY HOSTMAN, OF RKO.

On dias (left to right) Bill Kunzmann, retired National Carbon veteran; Nat Dorogoff, N. Y. State Compensation referee (Local 306); Bob Goldblatt, a founder of the Club; Paul Reiss, National Carbon Co.; Abe Kessler, president of Club; Charles Horstman, RKO projection head; Morris Ratker, past president; Morris Klapholz, secretary of Club; Ben Stern, Club treasurer; Harry Mackler, past president; Allen Smith, manager of National Theatre Supply branch in N. Y., and Jack Winick, vice-president of the 25-30 Club. Present were representatives of National Carbon Co., International Projector Corp., Altec Service Co., and RCA. Also, Ernie Lang, secretary of Local 306 and president of Projectionist Square Club. Delegations from Syracuse Local 376; Hudson County, N. J. Local 384; Westchester County, N. Y. Local 650; Nassau County, N. Y. Local 640, and N. Y. City Local 306 were present.

Kent County, R. I. The owners of a partially-completed drive-in theatre refused to negotiate a contract with the Local officials unless they got a reduction in the projection room manpower, and got a court order restraining the Local from picketing the theatre. Harold A. Benson, secretary and business representative for Local 677, lost no time in getting another court order lifting the restriction, and picketing was resumed.

Other union labor on the job refused to cross the picket line, and completion of the drive-in was delayed. Several weeks of intensive picketing resulted in the capitulation of the exhibitors, and a new contract was signed with the Local calling for the established two-man projection shift. Thus the two-man shift in drive-in theatres that has prevailed for so many years in the state of Rhode Island still remains intact.

The Movie Social Club of Kings County, Inc., comprised of members of New York City Local 306, awarded life membership cards in the Club to Dave Rednor and John Weidner upon their retirement from the Local. Harry Garfman (front center), Local 306 business representative for Brooklyn and Queens, is shown presenting the awards to Weidner (left) and Rednor (right). Club officials witnessing the presentation are (rear, left to right): Harry Weinberg, financial-secretary; Irving Meltzer, president; Dave Steinberg, recording-secretary, and I. Sillman, treasurer.

• John A. Shuff, business representative of Local 364, Akron, Ohio, has been elected 8th vice-president of the IATSE, succeeding the late Roger M. Kennedy, who died last March. Shuff has been a member of the Akron Local since 1921. In 1925 he was elected secretary of the Local, resigning from that office in 1932 to become the business representative, a post he has held ever since. During that period he completed 100% organization of theatres within a 30-mile radius of the city.

John A. Shuff

Under Shuff's leadership, Local 364 has taken an active part in civic affairs, contributing generously to various organizations. He has been personally active in civic and political affairs and during the late 1930's he was Democratic chairman in Akron.

• The annual season's-close party of the 25-30 Club of New York was held the latter part of June at the Grand Street Boys Clubhouse in N. Y. City. Not even the foul weather that evening (which cut deeply into the out-of-town guest roster) could dampen the high good spirits which prevailed at the affair.

Most apropos was the choice of the two men honored at the party—two really-and-truly projection men: Charley Horstmann, maintenance and construction boss for RKO Theatres, and Paul Ries of National Carbon Co., who probably knows more projectionists over a wider range of territory in the East than any other man. Both these lads have given much of themselves to the art and craft of projection and more than earned their respective honorary gold life membership cards and plaques.

Bill Reeves (left) and Tom Brown, members of Local 173, Toronto, Canada, represent a combined age of 154 years. Both men are projectionists and have unbroken records of working in their respective theatres without having missed a single day. For relaxation, Reeves takes an active part in Variety Club affairs; and Brown spends his leisure time in visiting foreign lands—a lifetime hobby.

IA President Walsh greeted at the Houston, Texas airfield upon his arrival to participate in Local 279's celebration of the burning of the mortgage on its headquarters building. Completed only four years ago, the building is now owned by the Houston Local free of any indebtedness. Shown above are, left to right: C. Nelson, L. 279, Houston; D. A. Brandon, L. 604, Corpus Christi; Walsh; E. J. Miller, L. 279; Harvey Hill, L. 249, Dallas; William B. Keeler, L. 407, San Antonio, and Clif Sparks, L. 330, Fort Worth.

IA Locals 376, Syracuse; Local 384, Hudson County, N. J.; and Locals 650 and 366 of Westchester County, N. Y., were represented by sizeable delegations, as were many manufacturing and theatre supply companies.

President Abe Kessler of the Club presented the honorary cards; while Bill Kunzmann presented the bronze plaque to his old National Carbon pal, Paul Ries; Morris Rotker, past president of the Club, made the plaque presentation to Charley Horstmann.

A fine spirit and good fellowship pervades this 25-30 Club organization, good for the art and the craft.

EYES and EARS

'Sanity' Projection Standard Proposed by Schlanger

Ben Schlanger, noted theatre architect and close student and advocate of proper screen proportions, viewing angles and the "illuminated screen surround" (maskless) announces several recent installations of a new type of standardized aspect ratio and screen size for *all* picture projection systems.

Schlanger asserts that by projecting anamorphic-type films on a basis of a 2 to 1 aspect ration and the non-anamorphic films on the basis of approximately a 1.75 to 1 aspect ratio, the width of the projected image can be the same for *all* picture projection. The increased flow of film product photographed for the new aspect ratios makes this *width standardization* feasible at this time

Simplified Projection Procedure

Because of projector light limitations for non-anamorphic film, this standardization applies to picture widths of approximately up to 38 feet. When the new type of adjustable anamorphic release prints, such as Paramount's Vista-Vision system, are available, it will be possible to obtain sufficient light output for picture widths greater than approximately 38 feet.

The anamorphic films can be shown with an aspect ratio of 2 to 1 by aperture plate-cropping slightly at the extreme side portions of the film, which eliminates only the most inconsequential photographic detail.

Moveable Masking Eliminated

This new screen standardization also completely eliminates the cumbersome and otherwise undesirable movable maskings on the sides and top of the picture required for the variable size picture projection. It also again makes it possible to introduce *fixed* luminous picture surrounds which found great popularity just about the time that the industry changed to large screens.

Summed up, Schlanger's proposal envisions a *fixed* screen area *via* standard projection lenses (non-anamorphic) and the use of anamorphic attachments *only* in the very largest theatres where very wide screen widths are desirable and feasible.

Also, the Schlanger proposal may be interpreted in terms of good projection for a full week instead of for only one-half week.

Ampex One-Track Magnetic Reproducing System

A single-track magnetic theatre sound system selling for $1625 has been developed by the Ampex Corp., Redwood City, Calif., pioneers in the magnetic aparatus field. The system is specifically built for those theaters desiring the great increase in fidelity achieved by changing from optically-recorded to magnetically-recorded sound, yet do not wish to invest in the equipment necessary for stereophonic sound.

Future Additions Simple

Based on the Ampex Master stereophonic system, the new Ampex single-track system uses identical components so that a theater which purchases single-track sound can, at any later date, install stereophonic sound without having to discard any equipment except one power supply, costing $55. He simply adds to his single-track master system. The single-track system makes use of the theater's present power amplifier and speaker system to hold costs to a minimum.

The entire system consists of two magnetic reproducers, a sound transfer box and extension rod, pre-amplifier, power supply and necessary accessories.

Mounting, Operational Details

Each of the reproducers is mounted on a projector. Adaptor plates are available for fitting the reproducers on any modern projection equipment. Cables lead from the magnetic heads in the reproducer to the transfer box, used to change sound output from one projector to the other. An extension rod makes it possible to operate the transfer swich from either projector position. Cables lead from the transfer box to the pre-amplifier enclosure, which measures 21 inches by 20 inches by 10 inches and may be mounted on the front wall. The on-off switch and the gain control for the magnetic system are included in the enclosure.

The output of the pre-amplifier is fed into the phonograph input of the theater's existing power amplifier. A selector switch, installed by the theater, makes it possible to select either phonograph input or magnetic sound system input.

Meanwhile, prices on the Ampex Master stereophonic sound systems have been drastically reduced, effective immediately. Typical of the new prices is that for a 20-watt, 3-channel stereophonic system, capable of handling a 1,000-seat house, which now sells for $3,195.

This complete stereophonic sound system requires absolutely no extras of any kind to put it into immediate operation, and full emergency facilities are provided.

"May I respectfully suggest, sir, that you use a wide-angle lens?"

Fight Theatre Tv Terrific B.O.

The resounding success of the recent closed-circuit theatre telecast of the Rocky Marciano-Ezzard Charles heavyweight championship fight has led many observers to believe that theatre Tv has lately been slighted as a strong potential source of revenue for exhibitors equipped to use it.

Piped to 61 theatres in 45 cities by Theatre Network Television, Inc., of New York, this telecast did excellent business in almost every location, grossing an estimated $450,000 in admissions.

N.Y.-N.E. Blackout Hurt

A typical example of the success of the telecast is the overall result obtained by 10 houses in the Stanley-Warner theatre chain which grossed $80,000. Several theatres reported business as 50% above previous telecasts. A limitation that kept the nation-wide gross from exceeding $450,000 was the fact that theatres in the heavily-populated New York-New England area were blacked out to avoid competition with ticket sales at the Yankee Stadium, which brought in approximately $500,000.

However, several drive-ins, although they filled their lots to capacity, only broke even. This was because of the high cost of building special towers and bringing in lines for the closed-circuit telecast to the less accessible drive-ins. All lines and relays, provided by American Telephone & Telegraph Co., are rented for only one

month. If it were possible to use them again during that period, a highly unlikely prospect, it would help the drive-in to pay off the cost of wiring. However, even at the break-even level, such telecasts are highly regarded as prestige builders and a lasting reminder of the advantage of outdoor shows of any kind.

Aural, Visual Quality Excellent

Reports from various installations indicate that the picture quality of this telecast was the best yet obtained. Nate Halpern, president of Theatre Network Television, has assembled his own crew for handling these telecasts, and this fact is credited with the constantly improving quality of the transmissions. On the exhibition end, projectionists have now acquired the requisite "savvy" in terms of familiarity with the equipment to provide clean, smooth transit of the image and sound to the screen.

Most significant feature of the successful theatre telecast was the fact that the aforementioned grosses were rung up despite a blow-by-blow description from the ringside via a nation-wide radio hookup.

Wollensak Vari-Focus Lens

The Wollensak variable-focus lens attachment now in volume production has attracted much interest in projection circles because of the variety of screen dimensions that may be obtained by simply adjusting a knob on the barrel and by changing aperture plates.

The Vari-Focus lens comes complete with adapter to fit Wollensak and Kollmorgen projection lenses. Bausch & Lomb lenses can be fitted by removing the adapter ring. The attachment weighs 3½ pounds, is 11½ inches long, and has a front diameter of 4 1/16 inches.

Some of the different focal lengths that may be produced by use of the Wollensak attachment and a single objective lens are as follows: with a 3-inch objective, focal lengths between 2¼ and 1¾ inches; with a 5-inch lens, any focal length from 3 to 4 inches.

This Wollensak supplementary lens, priced at $235, provides a means for cleaning without dismantling. The front element is moved to forward position, and the exposed knurled edge can then be turned counter-clockwise and removed. Further details are available from Wollensak Optical Co., Rochester 21, N. Y.

Thank You—

Please add the attached list to our group subscription and bill us on a one-year basis. Incidentally, all engineers employed by Northwest are IA men. We regard IP as an essential part of their technical reading.

Northwest Sound Service, Inc.
Minneapolis, Minn.

Bell Lab's New Battery is Powered by Sun's Rays

A solar battery, capable of converting useful amounts of the sun's energy directly and efficiently into electricity, has been demonstrated by Bell Telephone Laboratories. A small light-absorbing apparatus made of strips of silicon was used to show how the sun's rays could be used to power the transmission of voices over telephone wires. The solar battery also used energy from the sun to power a transistor radio transmitter carrying both speech and music.

Bell Labs reports that it was able to achieve a 6% efficiency in converting sunlight directly into electricity. This compares favorably with the efficiency of steam and gasoline engines, in contrast with other p.e. devices which have never been rated higher than 1%.

Higher Efficiency Expected

With improved techniques, Bell Labs expects to increase this efficiency considerably. Since nothing is consumed or destroyed in the solar energy conversion process, the Bell solar battery should theoretically last forever.

The experimental solar battery uses strips of wafer-thin silicon about the size of common razor blades. These strips are extremely sensitive to light. When they are electrically linked together, they can deliver power from the sun at the rate of 50 watts per square yard of surface.

Film Equipment Exports Up In 1953

	1952		1953	
	Number	Dollars	Number	Dollars
Motion Picture Projectors:				
35-mm. Projectors	949	497,794	878	521,890
16-mm. Silent Projectors	1,860	202,099	2,127	204,665
16-mm. Sound Projectors	10,092	3,038,594	7,700	2,572,821
8-mm. Projectors	5,527	350,319	10,957	565,683
Total	18,428	4,088,806	21,662	3,865,059
Other Motion Picture Equipment:				
Sound Recording Equipment	—	618,978	—	794,668
Sound Reproducing Equipment	—	768,181	—	1,120,661
Arc Lamps, Motion Picture	703	200,361	875	326,303
Motion Picture Screens	—	299,562	—	903,649
Motion Picture Projection Equipment Not Elsewhere Classified, & Parts	—	1,732,187	—	2,077,774
Motion Picture Studio Equipment	—	802,306	—	1,053,539
Total		4,421,575		6,276,594
		$ 25,692,819		$ 29,352,273

Courtesy, U. S. Department of Commerce

Tv Station Saturation?

More than 86% of the approximately 670 Tv stations serving 325 communities, envisioned as the Tv potential for the nation, have been authorized. In less than a year the number of Tv stations has been practically doubled. At the beginning of June, 377 Tv stations were operating in 237 communities of the U. S. Another 200 stations have been authorized to go on the air.

The remaining 100 or so applications, in various stages of hearings, will be, for the most part, determined within the next few months. This expansion of the world's greatest medium of mass communications has been accomplished within a year, after it had been forecast that the liquidation of the Tv "freeze" would take years.

Synthetic Vision 3-D Device

Synthetic Vision Corp., of Dayton, Ohio, announces that it is in production on a single-projector 3-D device and an automatic masking system for varying the aspect ratio of a screen from standard size to the 2.55-to-1 CinemaScope ratio.

The 3-D process is based on an attachment placed in front on the projector, mounted on the projection porthole, which appears to function in somewhat the same manner as the Nord and Polalite beam-splitting devices presented not long ago. However, R. V. Bernier, who developed the 3-D device, volunteers no information as to how it works.

Theatre Challenges Tv

Carrying the battle into the camp of the enemy, the Detroit Music Hall has been advertising its film attractions on the Tv pages of the Detroit newspapers in addition to its regular ads on the movie pages. The ads are hard-hitting and bluntly point out the advantages of the motion picture theatre over Tv.

EVOLUTION OF THE MODERN PROJECTION LENS

(Continued from page 6)

This lens was made possible by the discovery at Jena of new barium-crown glasses in 1886. As its name suggests, the anastigmat is corrected for the distortion called astigmatism and, simultaneously, for field-curvature. Fig. 2 shows the three elements of the anastigmat in cross-section.

The simple anastigmatic "triplet" shown here, even though it contains one lens less than the Petzval aplanat, is moderately expensive on account of the extreme accuracy with which the lens-surfaces must be figured. Expertly made with the highest-grade glasses, the anastigmat is an excellent medium- to short-focus lens. Although it gives a very flat field of fairly wide angular coverage, center definition usually does not quite come up to that obtainable with the Petzval, and contrast is also inferior to the brilliant images which the aplanat yields.

The triplet-type anastigmat is not much used in American theatres. The best-known example of this type of projection lens is the Meyer Trioplan (Goerlitz, Germany).

The Improved Anastigmat

A very satisfactory variant of the simple anastigmat is the "split-front triplet" shown in the lower drawing of Fig. 2. This was also originated by Abbe and Schotte. It serves the same purpose as the simple triplet, but it is ordinarily designed for somewhat longer focal lengths. The split-front anastigmat gives excellent definition over a wide, flat field with good pictorial contrasts. Similar in type is the Zeiss Kipro-Anastigmat.

There is only one other type of projection lens to be considered—the very latest 4-element, 6-lens Gaussian doppelanastigmat. A curious thing about this lens is that it was the first true anastigmatic lens ever made, even though it is the most advanced in design. Abbe and Schotte made their triplet anastigmat in 1890, but this superior quadruplet-type anastigmat was invented about 50 years earlier. It is, in fact, of about the same age as the old standard Petzval aplanat! Is there *nothing* new under the sun?

Every projectionist who keeps abreast of magentic sound developments by reading IP knows what is meant by "degaussing" projector parts. To degauss is simply to demagnetize. A *gauss* (rhymes with "house") is a unit of magnetic field-strength. Just as the volt, ampere, ohm, watt, farad, and henry were named after famous scientists, so also the gauss.

Gauss, A Versatile Genius

Karl Friedrich Gauss was a mathematical wizard who investigated the laws of electricity and magnetism and dabbled (very competently) in things optical. He once made a special telescope objective which, in basic design, was the same optical system as that employed in our most modern projection lenses!

Figure 3 shows the cross-section of the Gaussian doppelanastigmat. Note that the front and rear elements are single-lens units (as in the simple anastigmat) and that the two internal elements are meniscus-form achromatic doublets. The two lenses of each doublet are cemented together in all but a few makes.

Now, just what are the specific virtues, the superior characteristics, of the doppelanastigmat? First, all aberrations have been reduced almost to the vanishing point in the Gaussian lens. It has excellent resolving power, giving sharp, crisp images, and it reproduces pictorial contrasts nearly as well as a good Petzval aplanat. Most important, next to excellent definition, is the extremely flat and wide field (30 to 50 degrees) obtainable with this magnificent lens. This is the only regular projection lens that yields a

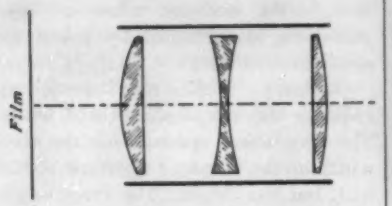
Lens E. F. In Inches	Approx. Angular Field	Type of Lens Recommended
1.00	53° 8'	Use special process-projection wide-angle lenses. Focus-drift, flutter, and vignetting severe.
1.25	43 37	
1.50	36 52	
1.75	31° 54'	Use Gaussian doppelanastigmats. At F:2 and faster speeds in the shorter focal lengths, film flutter and drift may be conspicuous; at slower speeds, hot-spot effect (vignetting) may be pronounced.
2.00	28 5	
2.25	25 2	
2.50	22 37	
2.75	20 36	
3.00	18° 56'	"Split-front" anastigmats of good quality may be used in this focal-length range.
3.25	17 30	
3.50	16 16	
3.75	15 11	
4.00	14 15	
4.25	13 26	
4.50	12° 41'	
4.75	12 1	
5.00	11 25	
5.25	10° 52'	Use Petzval aplanats. No undue film-flutter or focus-drift effects in this range regardless of speed of lens.
5.50	10 23	
5.75	9 56	
6.00	9 32	
6.25	9 9	
6.50	8 48	
6.75	8 28	
7.00	8 11	
7.50	7 38	
8.00	7 10	
9.00	6 21	

TABLE I

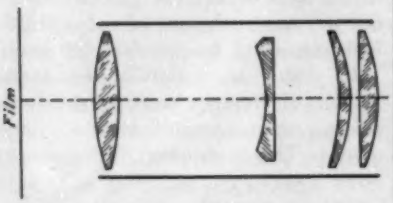
picture having sharp focus from edge to edge in the short focal lengths.

Most Advanced Design

When you read statements like these in the lens advertisements in IP, you may safely believe them when the



Anastigmatic



"Split Front" Anastigmatic

FIG. 2. At the top is shown the "triplet-type" anastigmat. This lens provides a wider and flatter field than the Petzval aplanat, but usually poorer center definition and less brilliant contrasts. An improvement is the "split-front" anastigmat shown in the lower drawing.

lenses referred to are doppelanastigmats. What are the trade names of some of them? The Super-Snaplite made by Kollmorgen is a Gaussian, so also the Super Cinephor made by Bausch & Lomb, the Super-Lite Hilux made by Projection Optics, the Alinar made by Zeiss Ikon (Stuttgart), and

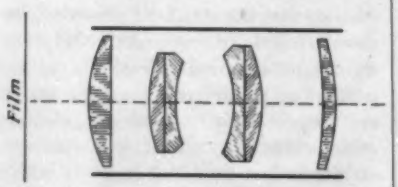


FIG. 3. This is the Gaussian doppelanastigmat, the most modern type of projection lens. It provides a wide, flat field, making it suitable even for lenses of the very shortest focal lengths. The image-quality obtainable with the "Gaussian" is superb. Kollmorgen's Super-Snaplites and Bausch & Lomb's Super Cinephors are of this type. Highly recommended in all the usual focal lengths.

the Super Kiptar made by JSCO (Goettingen). And there are many other makes of Gaussians of excellent quality.

The Zeiss Alinar merits special attention as the first projection lens of this type. Like Gaussians of Amer-

Loaded with

"COME BACK AGAIN" Appeal!

Scene from "Prince Valiant," 20th Century-Fox CinemaScope production

Bausch & Lomb

f/1.8

Super Cinephor

Projection Lenses

Sharpest image, uniform brilliance . . . edge-to-edge . . . on any screen!

Patrons enjoy *your* movies more because they see them better . . . when you use the new *f*/1.8 Super Cinephor lenses. They keep coming back to *your* theatre for today's clearest, sharpest, brightest movie images:

Normal 2D-3D, Expanded 2D-3D, and CinemaScope.

WRITE for new catalog E-123. Bausch & Lomb Optical Co., 1631 St. Paul St., Rochester 2, N. Y.

BAUSCH & LOMB

SINCE B&L 1853

ican manufacture, the Alinars have optical speeds ranging from F:1.8 to F:1.9. All of these are commonly regarded as F:2 lenses.

The performance of *all* modern projection lenses, whether Petzval aplanats or Gaussian doppelanastigmats, is greatly improved by anti-reflection coatings of magnesium fluoride on the glass-to-air surfaces. Not only does a coated lens transmit from 15 to 25% more light than an uncoated one of similar construction, but picture contrasts are better, giving lifelike "snap" and brilliant clarity to the images.

Then, too, modern lenses are faster than the old-timers. For all except lenses of short focus, the larger lens diameter is a distinct advantage, providing brighter, more evenly illuminated pictures without serious loss of "depth of focus." In the case of very short-focus lenses, loss of focus-depth unfortunately exaggerates the definition-ruining effects of film-flutter and buckle. This can be minimized by using "slow" short-focus lenses, although the hot-spot effect of lens-vignetting is increased by lenses too small in diameter.

Ordinary "wide-screen" projection requires the use of short-focus lenses. The wide-screen aperture has the same width as the standard aperture (0.825 in.), but less height. The exact height of the aperture depends, of course, on the aspect-ratio employed. For an aspect-ratio of 2:1 the aperture-opening will have a height of only 0.4125 inch instead of the standard 0.6 inch.

In order to maintain the same height of image as the standard screen, more magnification is required. This is supplied by the short-focus lens.

Wide-Screen Problems

This writer is a bit skeptical of the so-called wide-screen type of presentation because the defects of short-focus projection, together with emulsion graininess and inefficient screen illumination due to the smaller aperture, result in a comparatively poor image. Then, too, the relatively small vertical dimension of the wide screen is pictorially unnatural.

Somewhat larger screens could advantageously be used in most theatres, for the day of midget-sized screens is definitely over. It is our belief, nevertheless, that the standard photo aspect-ratio of 3:4 (more exactly 1:1.375) should be retained. Height is as important as width; and since the standard aspect-ratio provides somewhat more width than height, pictorial versatility is lost by expanding the width of the screen *without increasing the height proportionately*.

Advice on CinemaScope

CinemaScope, despite the generally poor quality of the screen image, holds the greatest promise of development into a process of enduring value for spectacular feature films, musical extravaganzas, and travelogs. Now, the performance of the CinemaScope anamorphotic cylindrical lens (or the alternative Tushinsky prismatic lens of adjustable expansion-factor) depends in a great measure upon the

HERE'S SOUND ADVICE!

If the confusion that surrounds the various sound systems being offered today has delayed your decision on just what you should install in your theatre, consider these facts:

Three of the majors — M-G-M, Paramount and Warner Brothers — have already announced that *all* future productions will have Perspecta Stereophonic Sound. Other studios are following their example.

Why has Perspecta Stereophonic Sound been chosen as standard — a standard certain to remain for years to come? For three very good reasons:

1. The movie industry wants to make money. To do this they know they must keep your box-office busy. Perspecta Stereophonic Sound will do just that by giving the movie-going public the dramatic realism they want.

2. Perspecta Stereophonic Sound is a system every movie exhibitor can afford to install.

3. Perspecta Stereophonic Sound Track operates identically with the optical sound track you've been using for years except for the inclusion of three low-level, low-frequency tones "heard" only by the Integrator, which automatically controls volume and direction for true stereophonic effect.

The Perspecta Stereophonic Sound Integrator, design-engineered by Fairchild, makes this system available to you at a price you can afford. Only one Fairchild Integrator serves all projectors in the booth — controls Perspecta Stereophonic Sound through any 3-channel sound system of standard make. And projector modifications are not required.

Call, wire or write *now* for full information on your specific theatre sound problem.

FAIRCHILD RECORDING EQUIPMENT

MOTION PICTURE SOUND DIVISION • WHITESTONE 57, NEW YORK

performance of the projection objective lens.

For the best CinemaScope the very best projection lenses must be used. We recommend anti-reflection-coated Gaussians of F:2 (or F:1.9) speed, although Petzvals in the longer focal lengths are just as good if similarly fast and anti-reflex-coated.

Short-focus projection lenses are *not* used for CinemaScope! For this special type of wide-screen presentation we use the *regular* projection lenses. It is the anamorphotic or prismatic auxiliary lens that "spreads" the CinemaScope image over the wide screen.

There are, as we have seen, four main types of theatre projection lenses (not counting rear-projection lenses and special 7-lens short-focus jobs). These are the Petzval aplanatic (the simplest and most common); the anastigmatic, the split-front anastigmatic, and the Gaussian doppelanastigmatic, which is the most modern type. The American projectionist need only consider the Petzvals and the Gaussians when selecting lenses, as the triplet and split-front anastigmats are not widely marketed in the U.S.A.

In Europe the Petzvals are still manufactured, as they are very desirable in the longer focal lengths; but the present tendency of American lens-manufacturers is to switch over completely to the more expensive Gaussians in all focal lengths up to 7 inches.

After careful comparison of these two types of lenses in action, this writer is of the opinion that the regular Petzvals (F:2, coated) are advantageous in all the longer focal lengths down to and including 4.5 inches. For all shorter focal lengths (4.25 inches down to about 2 inches) Gaussians of modern construction offer distinct advantages in their wider field coverage. These recommendations are summarized in Table I.

MPRC New Projection Aperture

Recommendations stemming from extensive experiments by the Motion Picture Research Council in the development of a single standard aperture size for CinemaScope projection have been forwarded to principal exhibitor organizations throughout the U. S.

The recommended aperture is 0.715 inches high by 0.839 inches wide, centered on the standard 0.600 by 0.825 aperture, precluding the necessity of shifting the projector in changing from CinemaScope to standard projection.

According to MPRC findings, projectionists should use the greatest film areas available to obtain the "best possible" quality, and the recommended aperture size is said to allow better utilization of the light available in the projector.

Error: Genarco Sales Projector

The Sales Robot advertising projector manufactured by Genarco, Inc., 97-04 Sutphin Blvd., Jamaica 35, N. Y., was described recently in IP as projecting a picture 5 by 6 *inches* on a rear projection screen, whereas this advertising-message projection unit actually projects a picture of 5 by 6 *feet*.

THE ACE CUE MARKER

The World's Best

One push to left or right and all cues are made in 16- and 35-, Standard, Tv, or CinemaScope

See your dealer or write to

ACE ELECTRIC MFG. COMPANY
1458 Shakespeare Avenue
New York 52, N. Y.

Real b.o. appeal . . . CHICAGO
A smash hit . . . BOSTON
Superb projection . . . DALLAS
Snaplite Lenses
Extraordinary impact . . . LOS ANGELES
This is it . . . KANSAS CITY
Powerful, colossal light . . . NEW YORK

Everywhere in Theatres and in Drive-Ins, SUPER SNAPLITES are giving patrons Great Projection for Great Pictures. For wire sharp projection, for terrific definition, for real patron satisfaction, install SUPER SNAPLITE Projection Lenses. And, the more difficult the job, the better: large screens, short throws, dusty conditions, if these are your problems try a SNAPLITE Lens.

Ask for Bulletin 212.

KOLLMORGEN Optical CORPORATION

Plant: Northampton, Massachusetts

New York Office: 30 CHURCH ST., NEW YORK 7, N. Y.

New Model Perspecta Units

A new model of the Fairchild Perspecta stereophonic sound integrator, designed as Model 315C and consisting of the standard integrator and power supply mounted on vertical chassis of the recessed type, will permit mounting in theatres installations where horizontal space is at a premium. The unit is designed for normal rack mounting and features easy accessibility to all components for installation as well as service. All under-chassis wiring may be reached by removal of the front panel.

Good Judgment Dictates

that you use the

CRON-O-MATIC

Fully Automatic

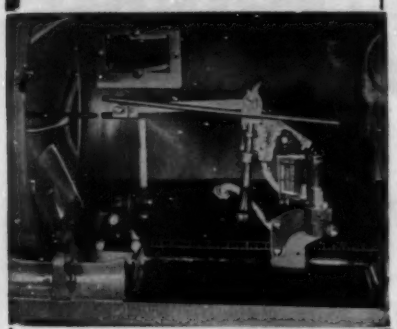
CARBON SAVER

on Ashcraft "D" and "E", Brenkert-Enarc, Peerless Magnarc, and Strong Mogul lamps.

AVERAGE CARBON SAVING

$400 A YEAR

Burns average lengths (3¼") down to ¾", saving 2½" or 22.2% of carbon costs. Uses positive carbon stubs of any length, without preparation. When entirely consumed, the new carbon goes into use without losing the light, or otherwise affecting lamp operation.



Only $42.50

If your dealer can't supply you, order direct.

DEALER INQUIRIES INVITED

PAYNE PRODUCTS CO.

(Cron-O-Matic Division)

2454 W. Stadium Blvd. Ann Arbor, Mich.

( ) Send literature on the Cron-O-Matic
( ) Ship Cron-O-Matic Carbon Saver:
( ) C. O. D., including postage.
( ) Remittance herewith.

Name .....

Theatre .....

Street .....

City & State .....

EXPORT: Frazar & Hansen, Ltd.
San Francisco, New York, Los Angeles

Nation-Wide Pay-See Tv Urged

Big pitch for subscription pay-as-you-see home Tv by all Tv stations, network and individual, is being made by Dr. Millard Faught, consultant of N. Y. City. The Dr.'s pitch is as follows:

1. Subscription Tv would be compatible with and a supplement to advertising-sponsored programming on all regular Tv stations, requiring no separate channels.

2. It would provide new economic support for present stations and new stations, and by adding premium programs not now sponsorable, would also greatly expand the Tv audience.

3. The net time and audience available to advertisers in the expanded Tv picture would be greater than now, but their share of all Tv's costs (which advertisers now pay in full) would be considerably reduced.

IA OBITUARIES

HENRY T. NORTH, 67, member of Local 486, Hartford, Conn. and projectionist at the Allyn Theatre, died last month. He joined the Local back in January 1920 and at one time served as its business representative. For many years he ran Kiddie shows for children at various institutions, particularly during the Christmas holiday, devoting much of his spare time to this worthy cause. His brother, Charles S., is the present b.a. of the Local.

ROMULUS ALBU, SR., 52, member of Detroit Local 199, died suddenly recently. He had been resting at his summer home at Port Sanilac when he was stricken with a heart attack. He is survived by his wife and a son.

EQUIPMENT & SUPPLIES
For EVERY Theatre Need!
NATIONAL
THEATRE SUPPLY
Division of National • Simplex • Dudgeon, Inc.

PERSONAL NOTES

JAMES M. CUNNINGHAM has been appointed western regional sales manager for General Precision Laboratory, Pleasantville, N. Y. A native Californian, Mr. Cunningham has a long background as a design engineer and system engineer, having been associated with Western Electric, American Broadcasting and Hughes Aircraft. He will make his headquarters in Glendale, Calif., and will be in charge of all commercial sales work of GPL on television transmitters, cameras, projectors and allied equipment.

JACK ROBINSON has been named vice president of the GoldE Mfg. Co., which produces reel-end alarms and other items of projection equipment. Robinson was formerly president of the Acme-Lite Mfg. Co., another producer of products for the photo industry.

SAM G. ROSE, president of the Victor Animatograph Corp., was presented with the Pioneer Award of the Society of Motion Picture and Television Engineers for his 30 years of service to the industry.

AN UNCONDITIONAL GUARANTEE ★ *from*

RAYTONE

The NEW HI-LUX SCREEN has reached a state of perfection that will meet the most *EXACTING PROJECTION* requirements

1 SEAMLESS CONSTRUCTION

2 UNIFORMITY OF SURFACE

3 SHARP DEFINITION

4 EVEN DISTRIBUTION TO ALL USEFUL ANGLES...

5 TEAR-PROOF CONSTRUCTION

★ *We back these claims with a money-back guarantee and you, Mr. Exhibitor, are the judge!*

RAYTONE SCREEN CORPORATION
165 Clermont Ave., B'klyn, N.Y.
Mid-West Office—L. E. Cooley • 408 S. Oak Park Ave., Oak Park, Ill.

ETHYLOID FILM CEMENT

FISHER MANUFACTURING CO. 1185 MT. READ BLVD., ROCHESTER 6, N. Y.

Mid-Summer Musings

JUST about the most heartening development in the motion picture exhibition field during the past year and a half was the recent decision by 20th Century-Fox to revise its policy on the showing of CinemaScope pictures. This was a smart and profitable move by Fox, and also a great relief to hard-pressed exhibitors.

It lifted from the exhibitor the burden of enforced outlay of capital for magnetic-stereophonic sound-reproducing equipment, and it made available to every theatre anywhere in the world the vitally-needed 20th-Fox product. Having opposed Fox in its previous CinemaScope policy, IP must now salaam.

All's Well that Ends Well

Let it not be assumed that IP didn't take its lumps during the controversy over Fox's insistence on controlling the method of CinemaScope presentation and the requirement of specific special equipment. One of the sorest spots on the IP anatomy developed as a result of our views relative to the stereophonic magnetic sound reproduction—and, of all things, the most savage of these jabs emanated from members of the organized craft on the West Coast.

IP never opposed stereo magnetic sound reproduction *per se*. Its stand apropos these 20th-Fox requirements was three-pronged.

1. It imposed a terrific financial burden upon the thousands of exhibitors who were struggling to keep going even at the then normal pace. Moreover, it did not of itself insure *continuing* good grosses after such an installation was made, and the first wave of customer interest had subsided—as it has. There was not even a guarantee to the point of paying off for the equipment and installation costs.

2. It denied to thousands of exhibitors access to all 20th-Fox product.

3. It seemed to IP that in thousands of small theatres the use of a truly wide screen was precluded by the physical characteristics of these theatres. Also, in many of these theatres the effect of stereophonic sound was lost.

Best for Big Houses

Naturally, when Fox started to mull over C'Scope presentation they thought BIG in terms of both screen size and sound accompaniment. This was fine for the big first-runs and even for some medium-size houses. But it seemed to IP that they thought TOO BIG in terms of the smaller theatres from both the architectural and economic view-points.

Stereophonic sound may seem to many people indispensable for a *very* wide screen in a large theatre. It would prove extremely interesting, however, to learn the *average* screen width possible in 80% of the total number of theatres.

Overall, it seems conclusive that IP's attitude was based almost wholly upon *economic*, not technical, consi-

Whether in 2 D or CinemaScope THE PRIME LENS IS STILL THE HEART OF YOUR PROJECTION SYSTEM!
HILUX
Super-Lite
Since the advent of CinemaScope hundreds of progressive theatre operators have equipped their projectors with Hilux and Super-Lite projection lenses—*for use as prime lenses* with their anamorphic attachments.
Your patrons, too, will appreciate the superior quality that over 30 years of lens craftsmanship have engineered into the Hilux f/1.8 and Super-Lite lenses.
HILUX f/1.8
$270.00 UP
SUPERLITE IIIC
$175.00 UP
PROJECTION OPTICS CO., INC.
330 Lyell Ave., Rochester, N. Y.
GLenwood 3993

derations—the cost of equipment and the enforced lack of needed product.

Happily, the elimination of all restrictions in the manner of presenting C'Scope pictures has resolved these vexing problems, and now the vitally needed product of all producers may be played anywhere on available equipment.

Another reason for increased interest in CinemaScope is the greatly improved photographic quality of the release prints. The special Fox presentation of "Advancing Techniques of CinemaScope" was a *pot pourri* of trailers describing forthcoming C'Scope films with a narration by Fox executives, demonstrating conclusively that the technical quality of CinemaScope films has increased tremendously since "The Robe." Much of the credit for this improvement is given to the new Bausch & Lomb anamorphic camera lenses that recently became available; but the consensus of informed technical opinion is that the higher quality is basically a result of steadily increasing "know how" on the part of technicians.

What stood out most clearly at Fox's demonstration of the improved CinemaScope picture was the increased sharpness and greater depth of focus now being obtained. As mentioned before, a new series of B & L Lenses which combine the camera taking lens and the anamorphic attachment, are chiefly credited with the improvement.

Eventually the new B & L camera lenses will include a series ranging from 13-mm to 152-mm in focal lengths, or in terms of horizontal field angles, from 122 degrees to 18 degrees, giving exceptional leeway to the cameraman and foreshadowing even finer CinemaScope photography. Until recently, only 35-, 40- and 70-mm lenses have been delivered.

NOTE: All long-time readers of IP will understand, of course, that IP does not now and never will lend acceptace to any projection aspect ratio above 2:1 — at the outside.

The Todd AO Process

Another noteworthy recent event was the demonstration of the Todd AO process in Hollywood after a year or more of secret development by the American Optical Co. This is a wide-angle camera and projection process that utilizes a 65-mm film and attempts the 3-projector Cinerama system with just one machine. Many observers say it succeeds, but the process will have to be shown to the public on a nationwide basis before its merit can be really judged.

The fact that the demonstration was widely praised is interesting in view of the fact that old Ernemann machines were used. These projectors, said to be in bad condition, had been laying around Hollywood since the big-film experiments of the 20's. New projectors, designed for Todd AO by the Phillips Co., of Holland, were not yet available. The screen used for the demonstration was 51 feet wide and 25 feet high, with a curve 13 feet in depth.

The shots shown in the demonstration included scenes that aimed at but most important was test footage from "Oklahoma" to be filmed in the Todd AO process.

Clayton Ball-Bearing Even Tension Take-Ups
For all Projectors and Sound Equipments
ALL TAKE-UPS WIND FILM ON 2, 4 AND 5 INCH HUB REELS.
SILENT CHAIN DRIVE
THE CLAYTON REWINDER
FOR PERFECT REWINDING ON 2000-FOOT REELS.
CLAYTON PRODUCTS CO.
31-45 Tibbett Avenue New York 63, N. Y.

SPLICES NOT HOLDING ?
Film breaks are costly.
Play safe by using
JEFRONA
All-purpose CEMENT
Has greater adhesive qualities. Don't take our word for it. Send for FREE sample and judge for yourself.
CAMERA EQUIPMENT CO.
DEPT. J-6-8
1600 Broadway New York 19, N. Y.

Vallen for
CURTAIN CONTROLS, TRACKS and SPECIAL OPERATING DEVICES
VALLEN, Inc.
AKRON 4, OHIO

ACE REEL-END ALARMS
The only ball-bearing reel-end alarms
Never fails—all sizes from 16" to 26"
Now $18.00
See your dealer or write to
ACE ELECTRIC MFG. COMPANY
1458 Shakespeare Avenue
New York 52, N. Y.

Lorraine ORLUX SUPER-CHARGED **LARGE-CORED Carbons**
For DRIVE-INS & THEATRES with HUGE, WIDE-AREA SCREENS • CARBONS, Inc. BOONTON, N.J.

NEW LIGHT ON THE PAST

(Continued from page 11)

Laboratory injected added excitement into the turbulent picture.

In his letter to Armat dated May 25, 1922, Edison refers to a Mr. Dickson in harsh language. Laurie Dickson, together with other Edison mechanics, was instrumental in the production of the Kinetograph, Edison's successful movie camera. But Dickson wanted to go beyond peep-hole viewers. He believed wholeheartedly in the feasibility of projecting motion pictures.

Edison's "Follow the Leader"

Edison, as we have noted, would have no part of projection until the successes of such projection pioneers as the Lumiere brothers of France and Robert Paul of London forced him to enter the field.

When Dickson learned that Major Woodville Latham and his two sons, Otway and Gray, were seriously interested in projection, he extended assistance in developing machinery for the new art; whereupon Edison, naturally, suffered an acute attack of disgruntlement. So, we learn, Dickson "double-crossed" the Great Inventor and "sold me out" to Latham "for his own benefit."

The Latham Showings

Now, the Lathams operated the world's first movie theatre two years before Armat played "The Sea Waves" and selected shorts as an audience-chaser at Koster and Bial's Music Hall. For, on May 20, 1895 in a vacant store at 153 Broadway, New York City, the Lathams established a "picture parlor" in which they screened the Corbett-Courtney fight. The screen results were nothing to brag about, but they *were* motion pictures, and they *were* projected on a screen for cash customers.

Edison read about this show in the New York papers and promptly "blew his top". He fumed. He called in reporters. He threatened to bring suit, not only against the Lathams, but also "against all who use the Latham Pantoptikon."

Woodville Latham, ruffled by Edison's peremptory blast, took pen in hand. In an open letter dated April 22, 1895, Latham questioned Edison's integrity and challenged the Great Inventor to project motion pictures on a screen "as I have done" and "to do so at once — if you can!" Edison couldn't — he didn't have a movie projector.

To the art of projection the Lathams contributed the film-loops above and below the gate and intermittent in both cameras and projectors. Armat subsequently adopted the "Latham loops."

Associated with Thomas Armat was Francis Jenkins, also of Washington, D. C. Since both were interested in the projection of movies, they formed a partnership which lasted only the few months required to build a crude projector — Armat's first. Armat subsequently built two better machines after the partnership was broken and, according to Edison's letter, "showed up Jenkins as a fakir" *(Edison's spelling)*. Fakir or faker, Jenkins flew the coop and worked solo.

"Dog" or "Beater" Movement

The "dog," or "beater," movement, which Mr. Gooch tells us was preferred by Jenkins, is pictured in two dis-

ROCK STEADY PROJECTION
IS A MUST FOR
3-D OR WIDE SCREEN

SUPER LaVezzi SERVICE
REG. U.S. PAT. OFF.

If your present equipment lacks the ability to project a picture that is "nailed on the wall" it will pay you to install a new LaVezzi Intermittent and its companion accessory the new E-78-L Film Gate. See your dealer for further information or write direct for illustrated brochure.

Aperture plates for all of the new aspect ratios for most projectors. Conversion Kits for most projectors and sound reproducers for CinemaScope.

LAVEZZI MACHINE WORKS
4635 WEST LAKE ST. • CHICAGO 44, ILL.

tinct varieties on page 5 of the July 1952 issue of IP. Jenkins' preference is entirely understandable, for in the old days the beater-type of intermittent was not a device to be ignored. It had many ardent advocates among projectionists. It has been used in many famous machines of yesteryear including the Jean LeRoy projector, the Prestwich, and the Victor.

No less a personage than Nicholas Power seriously considered the dog intermittent before he hit upon his famous pin-cross movement.

The dog-movement was noisy and rough on film, and it imparted jumpiness to the projected pictures. On the credit side were its extreme mechanical simplicity and its ability to handle film having torn sprocket holes.

Edison, Dickson, Latham, Armat, and Jenkins — a felicitous group indeed. All members of this happy little family undeniably made really significant contributions to the art of projection — even the Wizard of Menlo Park who invented the movie camera and established 35-mm film having 4 perforations to each frame on each side of the film. But progress was also being made in other quarters. To simplify matters, let's list the more important developments in projection between 1894 and 1898.

Cinematic Bibliography

SEPTEMBER, 1894. The Lathams, inspired by Edison's peep-show device, conceived a desire to *project* moving pictures.

MARCH, 1895. Successful Lumiere exhibition before a large audience at an industrial conclave in Paris. 35-mm film having one circular perforation per frame, run at the speed of 16 frames per second. Claw intermittent in combination camera-projector called the Cinematographe. This was the first 35-mm projector.

APRIL, 1895. Latham's completed Pantoptikon projector used for publicity showing.

MAY, 1895. The Lathams' movie theatre on Broadway opened — and soon closed. The Pantoptikon a dismal fizz.

AUGUST, 1895. All set up and ready to go was the Armat & Jenkins projector Number 1./ 35-mm film with Edison's perforations. 14-slotted star in Geneva-type intermittent that failed to intermit.

NOVEMBER, 1895. Wintergarten (Berlin) exhibition of "living photographs" by Max Skladanowsky. Weird double-film system for flickerless projection. Wide film, 8 frames per second.

Double-Geneva, 7-Slot

FEBRUARY, 1896. Robert Paul 35-mm screening at Finsbury Technical College, London. Bob used a double Geneva-type intermittent having 7 slots per star-wheel.

FEBRUARY, 1896. Armat's second machine, christened Vitascope, 35-mm, beater intermittent. It worked.

APRIL, 1896. Tom Armat's Vitascope showing of 35-mm Edison films at Koster & Bial's Music Hall, New York. Good results, but Edison's 48-frames-per-second epics slowed the action on the screen. Music Hall audiences, instead of being chased out of the theatre by pix, demanded encore.

Historic Showing in Germany

NOVEMBER, 1896. Messter's 35-mm, 16 frames-per-second exhibition at the Apollo Theater, Berlin. *First use of standard 4-slotted star-wheel in Geneva intermittent.* Messter's showing marked birth of standard film, for Edison's film specifications and the Lumieres' film-speed were combined.

MARCH, 1897. Armat's third projector, also called Vitascope, patented. Employed Messter's Geneva intermittent.

1897. Edison licensed by Armat. The Edison projectors called Kinetoscopes, like the peep-hole viewers. Paul of London adopts standard Geneva movement and invents safety devices.

1898. The Motiograph Optigraph projector, the first practical machine besides the Edison-Armat Kinetoscope for professional 35-mm projection.

1899. Projectors appear by the dozens, most of them similar to the Kinetoscope and the Optigraph, both of which had *open* Geneva movements.

Golden "Nickelodeon" Decade

1900 - 1910. The era in which commercial projector manufacturing began in earnest. The movies grow into a big industry and capture public fancy. "Nickelodeons" spring up everywhere, about 50,000 in the United States, almost 5 times the number of American film theatres in existence today.

I must say again that I find nothing in either Mr. Gooch's or in Armat's letters in violent disagreement with what I wrote in the articles referred to. Minor divergencies of opinion as to the priority of this or that detail of projector construction are bound to occur in a subject so confused and obscure as the history of motion picture arts and sciences.

To You Old Timers . . .

Any of you fellows who have grown up with the motion picture industry and who have used the earlier mechanisms can make a distinct contribution to projection lore by communicating to IP for publication herein all your experiences with these early-day projector mechanisms.

New Lamphouse Blower

A lamphouse blower unit intended to provide more complete ventilation to both lamphouses and projection room has been marketed by the Drive-In Theatre Mfg. Co. of Kansas City. The new blower unit was designed because it was felt that the increased heat and dust in the lamphouse resulting from the use of higher amperages made it advisable to provide a single-stack blower in addition to the company's double unit where each lamphouse "T's" into one pipe.

Forced Ventilation Process

Ventilating action is accomplished by a "squirrel-cage"-blower on the outside of the stack which forces air through the pipe via a special tube which runs inside the stack and releases the air with a forced jet action that creates the suction needed.

It is recommended that the blower stack not be connected directly with the lamphouse but rather entered into a "pan" or surrounding collar so that some air may be drawn from the outside of the lamp rather than entirely from the inside.

The DITMCO jet-action, single-stack blower which is designed to exhaust the arc lamphouse of all the heat, dirt, gasses and carbon dust.

In Mid-Summer

the Drive-Ins help

• • It's Christmas in July! . . . America's Drive-Ins do their share in Mid-Summer to help their Will Rogers Memorial Hospital to continue its wonderful record of TB healing in the Amusement Industry . . . Because Drive-In employees, and their families, are eligible for free TB care and treatment, they accept their part of the responsibility of maintaining their institution. So, Drive-In Exhibitors, and Employees are squarely behind the Mid-Summer Salute goal of TB healing through Research and skillful treatment—are YOU?

Drive-In Exhibitors—

DO THIS FOR YOUR HOSPITAL...

1. **Conduct a MIDNIGHT BENEFIT SHOW sometime during July.**
2. **Conduct an EMPLOYEE SALUTE. Sign Scrolls. Get Membership Cards.**

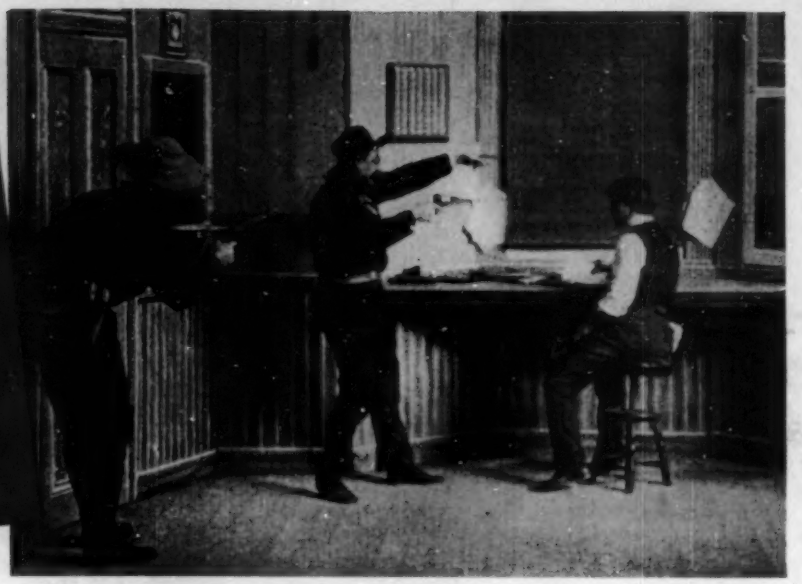
VOLUNTEER NOW!

Volunteer directly through your Will Rogers Hospital National Office, or through the Exchange Area Chairman who will contact you. Simply say, "Sure we'll help", and we'll see that you get the facts.

Variety Clubs **Will Rogers Memorial Hospital**

NATIONAL OFFICE: 1501 BROADWAY • NEW YORK 36, NEW YORK — Saranac Lake N.Y.

It all started with 50 feet of film...



• Motion pictures have come a long way since October 6, 1889!

It was on that date, Thomas Alva Edison showed the world its first continuous motion picture — 50 feet of film, running 13 seconds. Five years later in April of 1894, Edison's "Kinetoscope" was installed at the spot which today is 1155 Broadway. And so the commercial history of motion pictures began.

Things started to happen... in June 1895, Thomas Armat developed the "Vitascope" which incorporated the intermittent movement, the basis of all modern projection. The following April, Koster and Bials' Music Hall installed the first "Vitascope" and showed the first 1000 foot reel, setting the standard for "one-reelers."

In June 1901, George Melies, a Paris magician fascinated by the new medium, introduced fade-outs, dissolves, and double-exposures to his act — and laid a foundation for modern motion picture photography.

It was in Pittsburg in November 1905, Motion Pictures as we know it today "arrived,"... the first picture story, "The Great Train Robbery" opened in the first "Nickelodeon."

By now public fancy had been caught. In 1909 the multi-reel picture made its appearance — and the industry was on the march. Product improved, story improved, photographic techniques improved, the star system was born, motion picture houses opened throughout the land — throughout the world — and then... in 1927, with the opening of the "Jazz Singer" at the Winter Garden, sound burst forth upon the screen, followed shortly thereafter by all the beauty of color.

Now, let's take a "flash-back" to 1911. That was the year "Simplex" introduced its first projector and with it an improved image was seen upon the screen. With each new advance "Simplex" was there, working with the pioneers in sound, developing new techniques for the improvement of the projected image, always building better projection and sound equipment.

In recent times the motion picture has taken further giant strides with the introduction of full length features in 3-D, the panoramic magnificence of Cinemascope and wide screen plus the true-fidelity of stereophonic sound. Again it was "Simplex" which took the lead — always ready, always prepared, always a step ahead, with the very finest equipment available.

And so it will be for the future. The industry will continue to experiment, will always come up with something new and exciting. With each forward step you can be sure "Simplex" will be there taking its part in the ever increasing growth of this entertainment giant — the finest entertainment of them all — the Motion Picture!

Forty-Second

CONVENTION EDITION

CINCINNATI JULY 1954

INTERNATIONAL PROJECTIONIST

JULY 1954

IN TWO SECTIONS • SECTION TWO

INTERNATIONAL ALLIANCE OF THEATRICAL STAGE EMPLOYEES AND MOVING PICTURE MACHINE OPERATORS OF THE UNITED STATES AND CANADA

Affiliated with the
American Federation of Labor

ROOM 1900
1270 Avenue of the Americas
New York 20, N. Y.

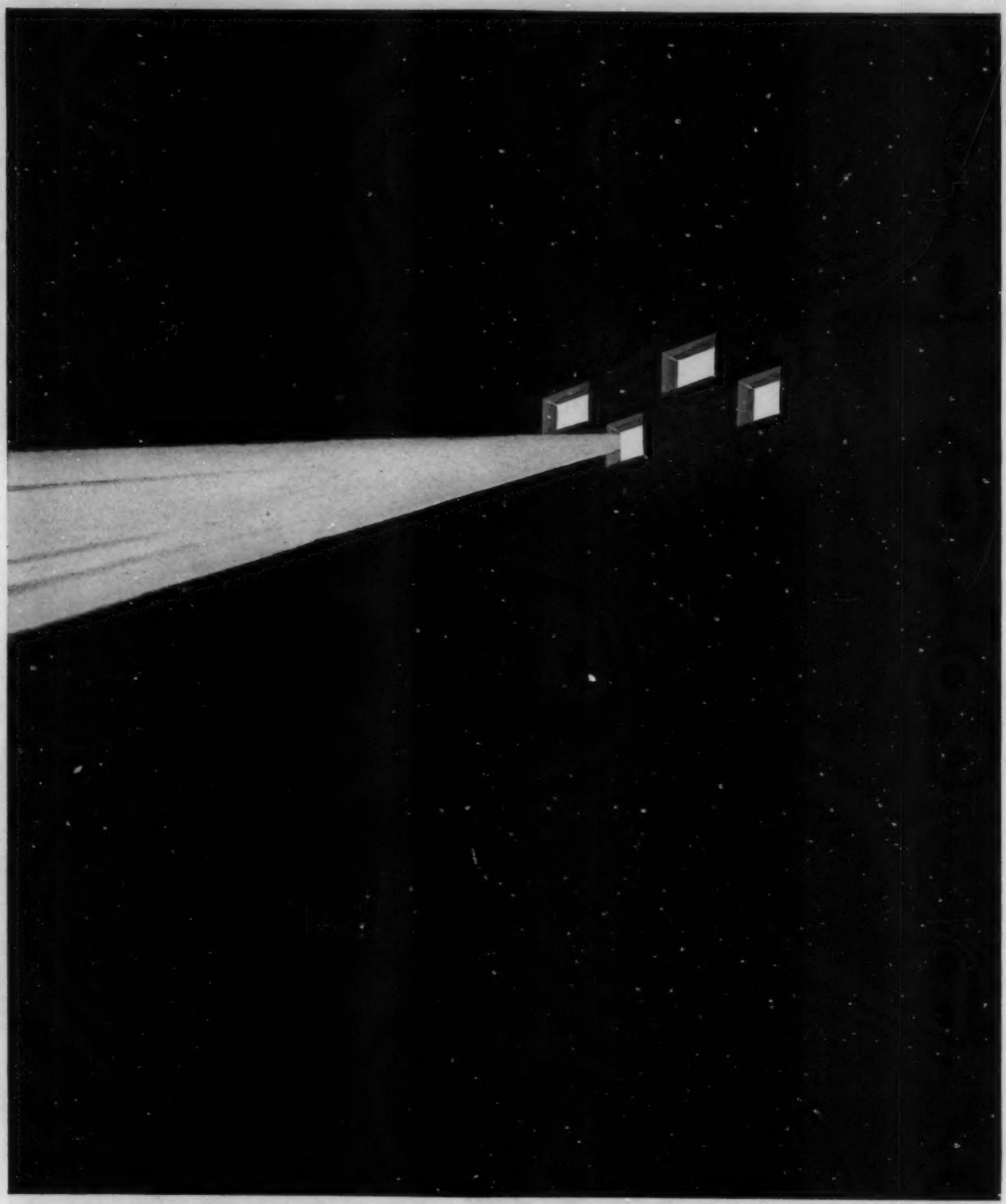
We welcome this opportunity to acknowledge the fine craftsmanship and superb artistry of the projectionist. Projection is an art . . . the projectionist is the artist. He is the artist who brings today's screen the finest entertainment value ever known.

For more than Thirty Years, we at Kollmorgen have provided the projectionist with his most vital single tool . . . Projection Lenses of the Finest Quality. Our mutual efforts have helped provide the American movie-going public with the finest entertainment value ever known.

K O C ®

KOLLMORGEN *Optical* **CORPORATION**

New York Office: 30 Church Street, New York 7, New York
Plant: 347 King Street, Northampton, Massachusetts



To the men behind the picture . . .

RCA SERVICE COMPANY, INC.
A Radio Corporation of America Subsidiary
Camden, New Jersey

Prescription for Good Projection

By BASIL T. WEDMORE

Theatre Systems Engineer, Westrex Corp.

WE ALL try to earn a living in the motion picture business, but we shall continue to do so only if the business is kept alive and healthy by our efforts. Since you are the doctor, let us look at the diseases to which your patient is liable.

The whole technical achievement of telling a story on film must pass through the bottleneck of the release print which is delivered into the projectionist's hands. Then it is up to you to use all your endeavors to obtain the best results, in the interest of the paying audience and yourself.

Prior Print Inspection Needed

The first thing to decide is whether the commercial article, the print itself, is a good one. This is not always easy, even in a first-run house, for if a defect be noticed, it may be only in this print, in every print, or in your own equipment.

Physical damage is easy to detect by close inspection of the print on the rewind bench, but suppose the sound track has been printed too dark, or the print was over-developed in the laboratory? Sometimes the color balance may be off or color fringing quite apparent in the picture on the screen. Only experience will tell us whether the sound or picture quality would be better on another print.

Assuming we have a good print beyond suspicion, let us turn to the equipment first. Let us look at the screen image. Is it in focus? In these days of large pictures, whether an anamorphic lens is in use or not, the focus is more critical than it was before—and for three major reasons:

(1) The magnification of the frame in the projector gate is greater, either in the horizontal direction only as in CinemaScope, or in *both* directions as in "wide-screen," "VistaVision," *etc.* The eyes of the audience are just as critical as they were before, especially near the center of the picture, so the focus must be held more closely.

(2) The focus is more critical in that in a large proportion of our theatres more light *and heat* is now projected than formerly. This is partly due to a general raising of standards over the years, and partly to the requirements of the modern processes.

Critical Focusing A "Must"

(3) Many theatres have fitted to their modern arc-lamps fast and highly corrected lenses for their big picture sizes. These lenses work at a larger aperture (this is the same as a smaller "F" number) than before. While an F:1.8 lens does give a brighter picture than an F:2.2, the depth of focus just *has* to be less and the control a little more critical.

Now ask yourself if your eyesight is quite as good as it was ten years ago. No? So the doctor's eyes are not quite so good and the patient requires more care. We all know the answer to this one, even if we haven't had to apply it in the past. Some projectors are fitted with a little telescope for focusing purposes. If not, a pair of binoculars is a great aid to accuracy, even a low-powered pair will do.

Big Screen Magnifies Shakiness

Now our focus is satisfactory; but what about the steadiness of the picture? It has been rightly said that there are many causes of unsteadiness. A picture which was adequately steady, though perhaps a little underlit, when it was 14 feet, 6 inches by 20 feet may be visibly rocking when it is blown up to 16 feet by 40 feet with plenty of light behind it.

The best tool for checking these faults is the Motion Picture Research Council's 450-foot picture test reel, "VTF", but any 3-D or CinemaScope target film is a great help. "Jump" and "weave" are easy to detect, especially if you sit in the front row of seats occasionally and look honestly for yourself. Incidentally, the use of the new narrow sprockets will not cause either jump or weave. If the sprocket or the shaft be out of "true" or the projector worn, you will get "jump". If the film guides are out of adjustment or the projector worn badly, you will get "weave". This is where you call in the specialist, to help the general practitioner.

Projector and Lens Vibration

Another disease that tends to get worse these days with the "advance of science" is picture movement due to vibration of the projector or the lens. In the days of the old universal base, with small lamp housings and small magazines and lenses, such trouble was rare; but with the motor raised forward and up, the lamphouse backward and up, and possibly a penthouse reproducer on the projector, to say nothing of 25-inch magazines, the story is now different.

Large, slow movements are easy to detect, but a shake of the lens due to the shutter blades being out of balance is hard to detect. It looks like intermittent jump, except that it may be rotary in character on the screen. A job for the specialist again.

Is the picture bright enough and is it easy to hold the illumination even? Let us look at the lamphouse. In order to get the highest efficiency, the makers generally recommend a specific working distance between

the arc and the mirror and the path of the film. These measurements are worked out to catch almost all the light and thread it evenly on the screen without making the arc too critical to operate, and without wasting light and heating the back of the picture gate.

It pays to know the *best* distance between the mirror and the film path, and to employ it. If you need an extra light shield, or to have part of the shield cut away to get the best efficiency, call in the specialist and by all means have it done.

Optical Alignment Check Imperative

In the same way, and this is an old story, it is a good idea to have the optical system dead in line. Otherwise, it is almost impossible to get, and hold, an even light. This too is a job for the specialist, although it can certainly be done by a general practitioner—if he has the tools to do it. The only exception to this rule is that a lens, such as one of the adjustable anamorphics, may be set purposely at an angle to reduce the keystone distortion caused by a steep projection angle.

One more common picture disease, and then we'll turn to the sound. Is the picture free from flicker? Now, some degree of flicker is always present, like the beating of a heart, but like the heartbeat, it should be steady and unnoticeable. The only serious flicker that you *cannot* avoid is when the camera is "panned" or swung (as in some shots we have seen from the cockpit of an airplane or from a moving train).

Common Causes of Flicker

When the projector and shutter adjustments are right, noticeable flicker is generally caused by one of three things.

(1) A single-phase rectifier as an arc supply always gives flicker. If the power line be 50 cycles, this is really bad. It can be cured or reduced, but the cure is generally quite expensive. Three-phase recitifiers, either vacuum-tube or the dry-plate types, are normally perfectly all right in this respect.

(2) The arc flame. Here your practiced eye can tell you what is happening. The flame must look steady. Any variation, whether from too little or too much draft up the chimney, will show on the picture. Any cyclic variation or jump that you can see will show on the screen. A job for the specialist? Perhaps; but first make sure that the draft is not too great and the carbons are good ones. The answer is generally not hard to find. Remember that a noisy arc is a flickering arc, whether the noise is hum or sputter.

Effect of Excessive Screen Brightness

(3) Excessive brightness of the picture on the screen. This can happen easily these days when projecting a standard (1.33:1 aspect ratio) picture onto the center section of a screen set up for CinemaScope or a wide picture. Unless you cut your light intensity, the picture will be above the recommended standards and will show flicker.

If the arc current cannot be reduced sufficiently, a quick remedy is to have a perforated metal grid made up to fit in front of the lamphouse to absorb the extra

(Continued on page 48)

White Screens? Yes-- Within Certain Limits

By LEONARD SATZ
Raytone Screen Corp.

THE writer has always advocated an adequate light source in the projection room for the job that must be done at the screen. It has been proven by SMPTE surveys that the majority of theatres in this country have always operated below the 9- to-14 foot-lamberts which have been set as a standard.

If adequate brightness is to be maintained at the screen, the Motion Picture Research Council tells us by way of a very comprehensive report that for wide-screen projection (not CinemaScope) the light loss will be as great as 48% at the 2:1 aspect ratio. While this light loss is reduced to somewhere between 30 and 38% with a CinemaScope system, the fact remains that a brightness gain on the order of 2 or 3 is required.

Huge Brightness Gain Required

This means that the brightness gain of any screen used for wide-angle or CinemaScope projection should be 200 to 300% greater than a standard white sheet. At the present time, this can only be accomplished with metallic surfaces or by increased light sources—or by a combination of both.

The average theatre using a Suprex projection system at 60 or 70 amperes will find that with a 27- or 28-foot white screen in *new* condition, 10 foot-candles of incident illumination can barely be maintained. This is not a particularly desirable result for a white screen. With CinemaScope, this same white screen would be sorely taxed to give good results at 34 feet.

Eastman Kodak Co. and many Hollywood studios advocate 20- to 25 foot-lamberts for the proper presentation of normal density Technicolor prints. Results will suffer as this foot-lambert reading is reduced.

Manufacturer's Responsibility to Industry

The writer is a screen manufacturer who can furnish regular white or seamless white screens in any size; however, since an obligation exists on the part of such a manufacturer to market a product that will give universally acceptable results, he advocates the use of a good all-purpose metallic screen. More likely than not, exhibitors using white screens will kick themselves when newly-developed 3-D systems will be made available—as they will, the writer does not doubt, in the near future.

If proper light studies are made, and if the results are carefully evaluated, many exhibitors might decide to use white screens. It is hoped, however, that a *generalization* will not be made on the desirability of white screens as against silver screens. It can be very misleading to "follow the leader" because the leader might have had some very special problems and probably accepted a white screen as a rather poor compromise.

★ ★ ★

Greetings

To the I. A. T. S. E.

On The Occasion Of Its 42nd Convention

★ ★ ★ ★

NATIONAL CARBON COMPANY

A DIVISION OF UNION CARBIDE AND CARBON CORPORATION

Finest Lenses Are Needed for New Projection Techniques...

THE ANSWER

Cinema Raptars

THE WORLD'S ONLY PERFECTLY MATCHED PROJECTION LENSES

Today with the new movie techniques—CinemaScope, Vista-Vision, Wide Screen—exhibitors must have the finest basic lenses in order to give theatre goers sharp, clear pictures from edge to edge of the screen. There are no finer projection lenses made than Wollensak Cinema Raptars. (For CinemaScope these lenses are used with anamorphic lenses.) Cinema Raptars use six and seven element construction. Only with such a design is it possible to deliver full speed, edge-to-edge sharpness, and highest resolution. In addition, Cinema Raptars are the world's only perfectly matched lenses—focal lengths matched to within .0025! Marked as matched (twin) lenses. Speed ranges are f/1.9 in focal lengths from 2" through 5" and f/2.0 to f/2.7 in focal lengths to 7" . . . priced from $180 each.

COMING!

NEW WOLLENSAK VARIABLE ANAMORPHIC LENS

1 TO 2 TIME MAGNIFICATION WITH ASPECT RATIO FROM 1.33 TO 2.55.

JUST PURCHASED NEW PROJECTION LENSES?

NEED ADJUSTMENTS FOR WIDE SCREEN?

WHAT TO DO WITH NON-ANAMORPHIC RELEASES?

With the new Vari-Focus lens exhibitors can show all the current screen releases without buying a complete new range of short focus lenses. The Vari-Focus permits you to make adjustments for screen width . . . change the focal length of your standard projection lens quickly and easily. (See table below.) The Vari-Focus is a supplementary lens which will produce any wide screen aspect ratio (non-anamorphic) when used in conjunction with a 3" to 6" projection lens.

The resolution and picture quality will match those of the finest projection lens. Price $235 each.

Standard Lens	Variable Focus From
3"	2¼" to 1¾"
3½"	2¾" to 2"
4"	3¼" to 2¼"
4½"	3½" to 2½"
5"	4" to 3"
5½"	4½" to 3½"
6"	5" to 3½"

MASTERPIECES of Optical Craftsmanship by **WOLLENSAK**

WRITE for new literature.
Wollensak Optical Co., Rochester 21, N. Y.

Keeping In Step With Progress

By W. L. JONES

Vice-President, Technical Products Service Division
RCA Service Company, Inc.

SOME 28 years ago sound entered the motion picture field. The new "talkies" were eagerly accepted by both patrons and exhibitors alike. Never in view of the paying public, but always responsible for the operation and performance of theatre sound, was that indispensable man — the theatre projectionist.

As new developments in sound and projection were adopted, the projectionist kept pace with the new techniques in theatres across the nation and throughout the world. And with him were the trained field engineers of RCA Service Company. Working together, the projectionist and the RCA field service engineer played a proud role in the success to which theatre sound and projection has risen through the years. Exhibitors know that without the cooperation of these two groups of theatre folk, a tremendous industry may have never developed to its present status.

The small group that began making service calls on theatres more than 25 years ago when the first battery-operated systems were used, has developed into one of the finest service organizations in the country — the Technical Products Department of RCA Service Company. The old-time serviceman, armed with a few simple tools, has become a thing of the past. Today his place has been taken by thoroughly trained experts equipped with the most modern test equipment and tools.

Nation-Wide Engineering Service

The rate of technical development and changes in the motion picture industry has been so rapid that only an organization having properly trained personnel can keep abreast of the developments and keep the field engineers properly informed.

The home office in Camden, N. J. forms the nucleus of RCA's service organization. Through these headquarters, the operation of the company's 11 field offices are coordinated. The strategic location of the district offices makes possible the placing of men and material anywhere in the United States in as short a time as is humanly possible.

At the home office a technical staff prepares and distributes technical information to a nation-wide field force. Keeping in touch with research and design engineers and other outside technical organizations, this group acts as a clearing house for problems submitted by field engineers. Solutions to all problems concerning theatre sound activity is not only sent directly to the engineer requesting it, but is disseminated to everyone in the field force.

Fully trained and experienced field service engineers and good supervision are a prerequisite for efficient service operation. Field personnel are brought into the home office for additional technical training. Nothing is left to chance, and once a problem is submitted, it is tracked down to its ultimate successful solution.

Strategically Located Field Offices

Responsible for activity in the field are eleven offices across the nation. Field engineers report to district managers in Boston, New York, Philadelphia, Atlanta, Pittsburgh, Cleveland, Chicago, Kansas City, Dallas, San Francisco and Los Angeles. In addition, there are supervisors in the districts and a staff of administrative

Left: From this compact control and monitoring rack, occupying a relatively small amount of space in the projection room, the projectionist operates the instantaneous theatre Tv system, used to present full-sized Tv images on the theatre screen. The optical unit which projects the Tv program is mounted on the front of the balcony.

Right: RCA service techniques keep pace with the latest developments. Shown is a field service engineer degaussing the soundhead used for four-track magnetic sound.

personnel to aid the district manager in utilizing the service activity of each district's engineering complement. Self-sufficient, each district maintains its own supply of parts, and emergency replacements are available at a moments notice.

Field service engineers are assigned a definite territory and this area is covered by a prearranged schedule of service calls. Responsible for the sound equipment in theatres in his territory, the RCA field engineer can be located quickly in event of emergency requirements.

The close contact and association between service engineer and projectionist has resulted in many important improvements in theatre equipment. The application of practical suggestions submitted by projectionists plays an important part in these improvements. The modern sound equipment of today is an outgrowth of some of these suggestions.

Progress in Theatre Sound Reproduction

Since the inception of sound in motion picture theatres, RCA has been a pioneer in technical developments to improve sound recording and reproduction. High Fidelity sound introduced a number of years ago was instrumental in broadening the audio response spectrum which resulted in more life-like sound reproduction. Similarly, the use of ultra-violet light in recording improved the fidelity so that a more faithful sound was obtained in the recording progress as well as in the reproduction process.

In the drive-in theatre field, RCA has constantly been ahead in design of rugged and economically priced equipment. Considerable engineering effort was spent in developing equipment that would be able to withstand the rigors of the elements. In 3-D, the field installation and service personnel worked shoulder to shoulder with the projectionist installing synchronizing equipment, filters, and greatly assisted in the tuning-up of the equipment.

Stereophonic sound which is so widely accepted today by projectionists and exhibitors, was used by RCA customers more than ten years ago when Disney's feature length production "Fantasia" was shown to the public. Music and movie critics alike have stated that stereophonic sound represents the greatest advancement in the motion picture industry since the advent of sound.

When 20th Century-Fox introduced "CinemaScope", again RCA led the industry by producing a 4-track magnetic sound reproducing system, and by installing these equipments in record time. Only the cooperation of the projectionist and sound engineer enabled the industry to meet the opening dates of so many theatres at one time.

E. Stanko (standing) manager, Engineering Section, and P. V. Smith, home office theatre specialist, use an FM audio oscillator to calibrate the RCA-developed flutter meter of the type used by service engineers.

Theatre Television Taken in Stride

The introduction of theatre Tv again found RCA leading the field in this new and impressive development. The mantle of theatre Tv fell naturally on RCA Service Co., for RCA has been a pioneer in television since the early days of its birth.

RCA Service Co. distributed its now famous "Theatre Television Handbook" and introduced the art of big-screen television to the projectionist. This book was prepared primarily with the needs of motion picture projectionists in mind and it also proved of considerable interest to others in the motion picture industry. An impressive volume, it was dedicated to the projectionists of the nation whose successful struggle with the introduction of sound motion pictures left no doubt that they could be relied on to cope equally as well with the new art of theatre television.

Further aiding the projectionists was the close cooperation between RCA Service Co., and the I.A.T.S.E. in the conducting of classes on theatre Tv. A selected group of theatre projectionists were brought into Camden from all over the country for training in the operation of the theatre equipment. The men were instructed by the Service Company's home office specialists, and at the end of the training were well qualified to operate the theatre Tv equipment in their respective theatres.

Supplementing the projectionists were the field members of the Service Company who also received special training on the equipment and its maintenance. The training of the field personnel was accomplished on a rotational basis, and as soon as one group of men completed their course they were returned to their districts and their places taken by another group of service engineers. Some of these engineers were then assigned to special demonstration teams and were active throughout the country in bringing this new entertainment medium to prominence. The extensive home office training plus actual field experience helped put RCA in a leading position in aiding exhibitors at the inauguration of theatre Tv.

Service Assistance to the Projectionist

No one is more conscious of the necessity of proper maintenance and emergency protection for sound equipment than the field service engineer. His daily routine not only centers on maintaining the sound quality, but includes a responsibility for recommending means for achieving the greatest possible insurance against failure. Still his job is not finished until all projectionists have been thoroughly rehearsed and have received a full explanation of the whys and wherefores of the added protective circuits or equipment. This is especially important when so many new circuits for 3-D projection and stereophonic sound have been added.

The field service engineers recommendations for spare

(Continued on page 47)

Greetings to the IA

— and thanks for your signal contribution to the successful operation of precision visual and sound reproducing equipment. Your expert craftsmanship has contributed mightily to the steady progress of Motiograph since its founding in 1896.

Together we can go on to meet the increasingly exacting demands of motion picture presentation.

Remember . . . all projectionists are invited to the Mammoth Theatre Equipment Show October 31 through November 4. Conrad Hilton Hotel — Chicago

MOTIOGRAPH *Inc.*

4431 WEST LAKE STREET • CHICAGO 24, ILLINOIS

The Carbon Arc:

Vital Twin Factor in Production and Projection

A compendium of engineering and operating data of carbon arc performance on motion picture studio sets and in theatres.

EMOTIONALLY, the characters and the story are the most important factors in motion pictures, but technically the entire subject is based on means of controlling the intensity and color of light. A phrase often heard in projection rooms is, "If the picture isn't on the film, we can't put it on the screen." A corrollary true statement is, "If the light isn't on the motion picture set, you can't put the picture on the film."

A motion picture is largely an appeal to the senses through vision, which is the ability to apprehend light and color. The success of modern cinematography is based upon the ability of the cinematographer to control the intensity and quality of light on the set. If the cinematographer be restricted in the use of proper lighting equipment, his finished product may appear like a skeleton, without flesh and color.

Historically, the use of artifical light in the motion picture industry has followed a number of recurring cycles. The use of various types of lighting equipment has not always been a matter of *evolution*. On several occasions there has been a *revolution* in which carbon arcs were moved down from the top place by incandescent tungsten lamps, and *vice versa*.

Major Influences Upon Lighting Technique

The major influences underlying these cyclic changes, on the production end, were many and varied, and high on the list in importance were the advent of panchromatic film, the arrival of sound-on-film, the application of three-color cinematography, and finally an economic factor which resulted in a major change in the spectral sensitivity of all color films.

On the projection front the demand for more and better screen light has been what may be termed persistently insistent, dating from the time that the exhibition field, slowly at first and then at an accelerated pace, became aware of the direct effect of the quality of the projected screen image upon the box-office. This awareness became acute with the introduction of 3-D pictures, with their concomitant loss of light due to the requisite use of accessory projection and viewing adjuncts; with the mushrooming drive-in theatres with ever-expanding screen area, and then the arrival of the various wide-screen processes.

In modern motion picture photography light from the sun, from the carbon arc, from incandescent tungsten is directed to the object to be photographed. By reflection this light is redirected to the film where it provides a photo-chemical reaction. The film, so modified, acts only as a filter to control the intensity and quality of light from a projector. The modified projected light remaining after it has passed through the film is reflected from the screen to the eyes of the audience, where it again makes an impression which should coincide dramatically with the original action.

Control of Quality, Quantity of Light Vital

It would all be a simple matter of floodlighting if the work "dramatically" did not carry such strong implication. The enhancement of dramatic action requires that the cinematographer have as perfect control of *both* quality and quantity of light as possible.

The advent of modern full-color cinematography brought with it a number of new lighting problems. To visualize them it is only necessary to consider that in black-and-white cinematography light creates film density which is merely a medium to control the intensity of the rays from the projection light source. The audience gains the illusion of a picture by variation of light and shade.

In color, however, it is also necessary to use a light source containing the three primary colors of the spectrum in order to produce color, hues and tints. Because white light is made up of equal quantities of the light primaries (blue, green and red) it has been chosen as the source for professional color cinematography. The use of white light for interiors also simplifies the process because sunlight is white light and the same

Color Cinematography Requisites

film may be used on exteriors as on interiors.

If the projection light source contained no blue, there would be no blue on the screen regardless of the color of the film. The same is true of the light sources used in set lighting. The color is in the light, and the objects serve only to *selectively* reflect the various rays from the light source to the film in the camera.

In black-and-white cinematography the absence of light results in a black image on the screen which in many cases is accepted by the viewer as an intended

shadow. Under adverse conditions a character in a dark suit may appear only as a face, hands and white shirt, with no detail whatever in the suit; still the viewer will accept the result.

The foregoing is not true with color. Here the absence of light is also black; but if a character wearing a dark-colored suit moved into an area where the light level were too low, the suit would appear black, which would not be acceptable to all. The same thing could happen to a colored dress with deep folds where the absence of light in the shadow areas might make it appear as having black stripes.

In the early days of color motion pictures the somewhat lower latitude of the process brought forth some proponents of "flat" lighting. It was their contention that the sets should be illuminated with highly diffused light sources, the differences of intensity reduced to a minimum, and that color itself would provide the necessary depth and contrasts. As a matter of fact, modern color has brought about demands for lighting equipment with *much greater scopes* than was previously dreamed of with black-and-white. Brilliance, volume, color, penetrating power, and controllability have all been vastly improved in modern lighting equipment.

Inasmuch as white light, or sunlight, quality is required for color, the only unfiltered light source to meet completely the requirement is embodied in the carbon arc "broadside" and the "spotlamps," each fulfilling a specific need and supplementing each other.

Modern Movie Lighting Keyed to "Action"

The old adage of "Light for the shadows and let the highlights take care of themselves" is no longer apt. The modern cinematographer lights for the "action," which is most important. He adjusts the "key light," the illumination falling on the face of the principal character, so those reflected rays will make suitable density on the film; then he accurately balances the illumination in the highlight and shadow areas for the artistic effect he wants. His ability to create the desired dramatic illusion is the measure of his worth.

In the entertainment field, standardization of technique often result in formula without novelty, or apparent difference. It is quite true that people want formula, that they will not accept anything which does not carry a familiar connotation. They will pay money to see the same thing they saw last week or last year. They want it to be the same—but they want it to be *differently the same!*

To satisfy this requisite the cinematographer must have absolute freedom of choice for the *improvement of production values* rather than be restricted by the demand for small economic squeezing which robs him of the initiative it takes to make something differently the same.

Early pictures presented sharp contrast in light and shade with little intermittent gradation of tone, and a relatively low level of screen illumination gave satisfactory reproduction. Improved emulsions permit a wide latitude of tone gradation and the perfection of modeling and detail. This, in turn, requires a high level of screen illumination for effective reproduction of this photographic quality on the screen. At dusk one can see the outlines of buildings, trees and other features of the landscape but few of the surface details which are clearly visible in stronger light.

Studio, Projection Lighting Blood Brothers

Projection follows the same rule. A good intensity of screen illumination is needed for the audience to see the full quality and beauty of the photography. A screen brightness of 9 to 14 ft.-lamberts at the center of the screen is specified by the American Standards Association, as recommended by the Society of Motion Picture and Television Engineers. At 75% reflectivity this represents a light intensity of 12 to 19 foot-candles at the center of the screen, or, 80% side-to-center distribution, 10 to 16 average foot-candles over the entire screen area.

Introduction of color in motion picture photography has given importance to the color quality of projection light. 35-mm film for theatre use is processed to give accurate color values on the screen when projected with snow-white light, that is, light in which all primary colors are present at essentially equal intensity as in daylight. Projection light of other quality distorts the colors on the screen and detracts from the impression of reality.

The addition of sound to the motion picture film might seem to have no bearing on projection light requirements, but in reality it does. The frame dimensions of the picture on sound film have been reduced from those of silent film to provide a marginal space for the sound track or tracks. As a result, with the same optical factors used for silent pictures, a light source of 24% greater brilliancy is needed to project the same volume of light through the aperture and film and produce a screen image of equal area and brilliancy.

Some Recent Advances in Projection Systems

Recent years have seen important new developments in all aspects of motion picture projection systems. Hitex* 13.6-mm super high-intensity carbons were introduced in 1949 for use in rotating-carbon, condenser-type lamps at 170-180 amperes.

Introduced about a year and a half ago was a new 13.6-mm standard high-intensity carbon to replace the former one used in condenser-type lamps at 125-150 amperes. A new Suprex* 9-mm positive carbon has extended the range and output of the non-rotating carbon, reflector-type lamp used with copper-coated, non-rotating carbons. A new Suprex 7-mm positive has made possible increases in efficiency and light output compared with Suprex 7-mm carbons formerly used. New high-speed, reflector-type lamps employing rotating 9-, 10-, and 11-mm positive carbons have been marketed and are finding wide usage.

In addition to these combinations already in commercial usage, National Carbon Co. has developed several new carbons specifically to meet the demands of the new projection systems. These include the new Hitex 10-mm carbons for rotating-type reflector lamps; and the new Ultrex* 10-, 11-, and 13.6-mm carbons which are most effective when used with adequate water-cooling in rotating-reflector as well as condenser-type

* The terms "Hitex," "Ultrex" and "Suprex" are trade-marks of Union Carbide and Carbon Corp.

SCREEN ILLUMINATION WITH CARBON-ARC MOTION PICTURE FILM PROJECTION SYSTEMS: BASED ON THE STANDARD 0.600 X 0.825-INCH APERTURE

CARBONS		Arc		Lamp optical sys.	80% dist.		Max. light[3]		Approx. carbon consump. rate, in./hr	
Positive	Negative				Screen lumens[1]	% dist.[2]	Screen lumens[1]	% dist.		
Type	Type	amp	volts						Pos.	Neg.
Non-Rotating, Reflector-Type Lamps—"One Kilowatt" d-c Trim										
7-mm × 12 or 14 in. Suprex	6-mm × 9 in. Orotip C	40	27.5	11¾ in. dia *f*/2.5 mirror	5,900	80	6,500	65	5.8	3.4
Non-Rotating High-Intensity Trims										
7-mm × 12 or 14 in. New Suprex	6-mm × 9 in. Orotip C	42	36	14 in. dia *f*/2.3 mirror	7,250	80	8,650	60	7.6	3.8
7-mm × 12 or 14 in. New Suprex	6-mm × 9 in. Orotip C	46	38	14 in. dia *f*/2.3 mirror	8,150	80	10,000	60	9.3	4.0
7-mm × 12 or 14 in. New Suprex	6-mm × 9 in. Orotip C	50	40	14 in. dia *f*/2.3 mirror	9,200	80	11,700	60	11.6	4.3
8-mm × 12 or 14 in. Suprex	7-mm × 9 in. Orotip C	60	36	14 in. dia *f*/2.3 mirror	10,300	80	11,000	65	9.0	3.8
8-mm × 12 or 14 in. Suprex	7-mm × 9 in. Orotip C	65	38	14 in. dia *f*/2.3 mirror	11,800	80	12,700	65	11.8	4.0
8-mm × 12 or 14 in. Suprex	7-mm × 9 in. Orotip C	70	40	14 in. dia *f*/2.3 mirror	13,000	80	14,000	65	15.0	4.3
9-mm × 14 in. Suprex	8-mm × 9 in. Orotip C	65	41	14 in. dia *f*/2.3 mirror	12,300	80	13,000	70	10.5	3.3
9-mm × 14 in. Suprex	8-mm × 9 in. Orotip C	75	45	14 in. dia *f*/2.3 mirror	13,800	80	15,000	70	15.5	3.8
Rotating, Reflector-Type Lamps										
9-mm × 20 in. High-Intensity	5/16 × 9 in. Orotip	75	52	16–16½ in. dia *f*/1.9 mirror	13,000	80	16,000	60	14.0	3.3
9-mm × 20 in. High-Intensity	5/16 × 9 in. Orotip	85	58	16–16½ in. dia *f*/1.9 mirror	15,000	80	19,500	55	22.0	3.5
10-mm × 20 in. High-Intensity	11/32 × 9 in. Orotip	100	60	16–16½ in. dia *f*/1.9 mirror	16,000	80	20,000	60	20.0	3.0
11-mm × 20 in. High-Intensity	3/8 × 9 in. Orotip	120	65	16–16½ in. dia *f*/1.9 mirror	(20,000)	80	(23,000)	65	20.0	2.7
10-mm × 20 in. Hitex	5/16 × 9 in. Orotip	125	64	16–16½ in. dia *f*/1.9 mirror			24,000	65	19.5	2.4
10-mm × 20 in. Hitex	5/16 × 9 in. Orotip	130	66	16–16½ in. dia *f*/1.9 mirror	(21,000)	80	25,500	65	25	2.6
10-mm × 20 in. Hitex	5/16 × 9 in. Orotip	135	70	16–16½ in. dia *f*/1.9 mirror			26,500	65	32	1.7
10-mm Ultrex[4] Experimental	Experimental	165	80	Exper. *f*/2.0 mirror			(34,000)	(60)	45	
11-mm Ultrex[4] Experimental	Experimental	195	80	Exper. *f*/2.0 mirror	(28,000)	80	(35,000)	(65)	45	
Rotating, Condenser-Type Lamps										
13.6-mm × 22 in. New High-Intensity	5/16 × 9 in. Orotip	125	68	Condenser lenses at *f*/2.0	11,500	80	14,500	60	7.25	2.4
13.6-mm × 22 in. New High-Intensity	½ × 9 in. Orotip	150	74	Condenser lenses at *f*/2.0	16,000	80	19,500	60	14.0	1.9
13.6-mm × 22 in. New High-Intensity	½ × 9 in. Orotip	160	77	Condenser lenses at *f*/2.0	(16,500)	80	20,500	60	17.5	2.1
13.6-mm × 22 in. Hitex Super	½ × 9 in. Orotip Heavy Duty	170	70	Condenser lenses at *f*/2.0	17,500	80	20,700	60	16.0	2.3
13.6-mm × 22 in. Hitex Super	½ × 9 in. Orotip Heavy Duty	180	74	Condenser lenses at *f*/2.0	19,300	80	24,800	60	21.5	2.5
13.6-mm × 22 in. Ultrex[4] Experimental	Experimental	265		Condenser lenses at *f*/2.0	(26,000)	80	(28,000)	(60)		
13.6-mm × 22 in. Ultrex[4] Experimental	Experimental	290	80	Condenser lenses at *f*/2.0	(30,000)	80	(34,000)	(60)	45	

NOTE: Values in parentheses are estimated or obtained from limited measurements.

[1] Screen lumen figure is for systems with no shutter, film or filters of any kind; measured with 5-in. E.F. *f*/2.0 and *f*/1.9 projection lenses.

[2] % distribution refers to ratio of light intensity at side of screen to that at the center.

[3] Maximum light is value with system adjusted to produce maximum light intensity at the center of the screen.

[4] Experimental carbons burned with short protrusion in experimental water-cooled silver jaws.

Copyright 1954 by Union Carbide and Carbon Corporation.

lamps. While Ultrex carbons have not been marketed yet, they will be available when suitable lamps are announced.

Carbon Combinations, Light Levels, Distribution

Figure 1 shows maximum screen lumens at different arc currents for various lamp and carbon combinations with no film, shutter or filters. Values of screen lumens obtained with the lamps and optical systems adjusted to produce 80% side-to-center distribution ratio are not shown, but they generally fall 10 to 25% below the maximum values. Fig. 1 shows that the rotating-type reflector and condenser lamps are capable of projecting more than 20,000 lumens with *standard* carbons, and more than 30,000 lumens with suitable *experimental* carbons.

In some cases, these lamps can project more light and heat onto the film than can be accommodated without some suitable cooling means. This article does not specify means of protecting the film from high levels of radiant energy flux; it points out, however, that the use of infra-red absorbing filters, infra-red reflecting filters, controlled air-blast, and the use of a water-cooled film gate have all been asserted to provide some protection to the film.

Such protective means may require the sacrifice of a small portion of the screen light and will correspondingly change the lumen values of Fig. 1.

Screen Widths and Light Levels

The light requirements of the new projection systems may be analyzed in correlation with these latest developments, beginning with a restatement of the American Standards Association *indoor* theatre standards, which recommends a screen brightness of 9 to 14-foot lamberts with the projector running and no film in the gate.

The data of Fig. 1 have been used to calculate the

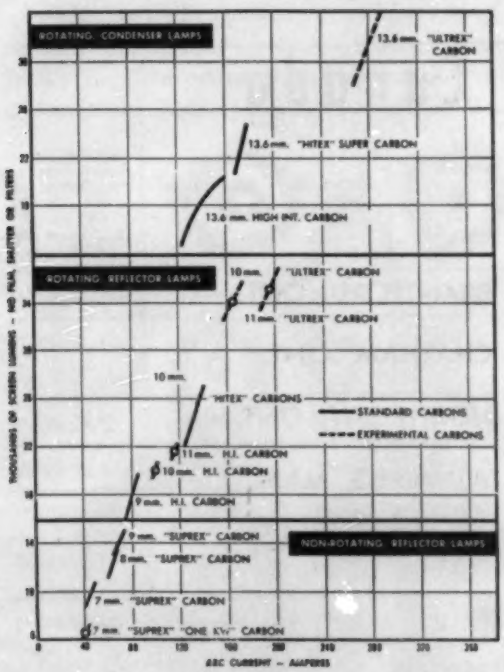

ROTATING CONDENSER LAMPS
13.6 mm. "ULTREX" CARBON
13.6 mm. "HITEX" SUPER CARBON
13.6 mm. HIGH INT. CARBON
ROTATING REFLECTOR LAMPS
10 mm. "ULTREX" CARBON
11 mm. "ULTREX" CARBON
10 mm. "HITEX" CARBONS
STANDARD CARBONS
EXPERIMENTAL CARBONS
11 mm. H.I. CARBON
10 mm. H.I. CARBON
9 mm. H.I. CARBON
9 mm. "SUPREX" CARBON
8 mm. "SUPREX" CARBON
7 mm. "SUPREX" CARBON
7 mm. "SUPREX" "ONE KW" CARBON
NON-ROTATING REFLECTOR LAMPS
THOUSANDS OF SCREEN LUMENS — NO FILM, SHUTTER OR FILTERS
ARC CURRENT — AMPERES

FIG. 1. Maximum screen light *vs.* arc current.

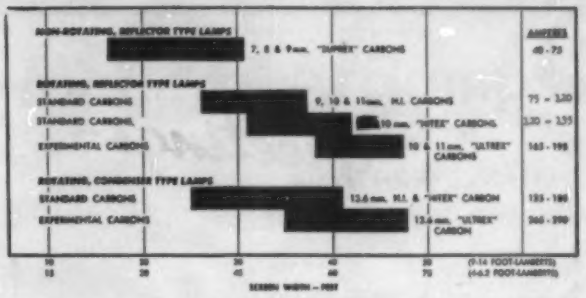


FIG. 2. Size of screens capable of illumination to indicated screen brightness at the center of the screen. [Based on maximum light, 50% shutter transmission, 90% projection port transmission, 75% screen reflection factor, and a 4 x 3 picture aspect ratio.]

widths of screens which can be illuminated to the aforementioned ASA standards, with a projection shutter of 50% transmission, a projection room port glass of 90% transmission, and a projection screen of 75% reflection factor.

The resultant screen widths are shown in Fig. 2. The lower ends of the screen width ranges shown in Fig. 2 belong to the smaller and lower power carbon trims and to the *maximum* recommended screen brightness; while the larger screen widths pertain to the larger and higher power combinations and to the *minimum* recommended screen brightness.

No allowance has been made for light losses that may occur with heat filters which may be needed under some conditions to prevent heat-on-film troubles. The data on Fig. 2 will be correspondingly altered in case there are any additional light losses beyond those assumed. For example, a 10% loss in light will reduce the indicated screen widths about 5%.

Outdoor Theatres Pose Difficult Problem

Reference to Fig. 2 shows that Suprex carbon trims are capable of illuminating screens approximately 16 to 30 feet wide at maximum light. Rotating-type reflector lamps increase these screen widths from 26 to 37 feet with standard carbons. Generally speaking, the rotating-type condenser lamps are capable of illuminating about the same width screens as the rotating-type reflector lamps.

The foregoing discussion shows that present difficulty of lighting screens of 50 to 70 feet width, common in outdoor theatres, to the standard of 9 to 14 foot-lamberts applicable to indoor theatres. However, the screen brightness requirements of outdoor theatres are not as precisely known as are those for indoor theatres, because of the widely variable physical conditions. Just what level of screen illumination can be obtained on these large screens depends upon the maximum amount of light obtained from the projection system.

Increasing the indicated screen width by 50%, *without changing the present standard ratio of height to width*, corresponds to a screen area 2.25 times greater. Such a screen can be illuminated by the combinations of Fig. 1 to a center brightness of 4 to 6.2 foot-lamberts. These screen brightness limits have been chosen *not* because

(Continued on page 47)

Greetings

from

GENERAL THEATRE SUPPLY COMPANY, LIMITED

Toronto • Canada

● BRANCHES:

HALIFAX, N.S.
SAINT JOHN, N.B.
MONCTON, N.B.
MONTREAL, P.Q.
OTTAWA, ONT.
BRANTFORD, ONT.
CHATHAM, ONT.
NORTH BAY, ONT.
WINNIPEG, MAN.
CALGARY, ALTA.
VANCOUVER, B.C.

Flexibility Marks Modern Arclamps

By ARTHUR J. HATCH
The Strong Electric Corporation

GENERALLY SPEAKING, if the historical development of a class of devices is studied, it is found that as the flexibility of the device is increased a compromise in quality, efficiency, or operational ease is necessary so that the flexibility goal can be achieved. This has not been so, however, in the instance of the Strong Mighty 90 and Super 135 projection arc lamps, whose range of flexibility has been increased in many ways without compromising with quality.

As an example, in the low-intensity lamp the range of carbon burning rates from the highest value to the lowest value was approximately a 1.3:1 ratio. The Suprex type of arc had a burning rate range of 1.75:1; while the 1 Kw type of lamp had no range whatever, since it had to burn at the one fixed current for which it was designed.

Wide Flexibility in Light Level

The Strong Mighty 90 and Super 135, however, have an overall carbon burning rate range ratio of 2.5:1. Converting this to inches of carbon per hour, this means that these new type lamps are capable of burning as slow as 13 inches or as fast as 32 inches of carbon *per hour*. Correspondingly, the arc current range of the Mighty 90 and Super 135 is 1.8:1 as compared with a 1:1 ratio in the instance of the 1 Kw.

In addition to the flexibility in burning rates, there is of course a corresponding flexibility in the amount of light that can be produced by the Strong Mighty 90 and the Super 135. From the lowest to the highest light level there is a range of 1.7:1 ratio; whereas in the Suprex the ratio runs 1.55:1; while the 1 Kw, with its fixed burning rate, had a fixed light output. The low-intensity lamp, due to the fact that the intensity of the crater remains approximately the same through quite a range of carbon sizes and currents, has a light range ratio of only 1.2:1.

Most low-intensity lamps were capable of burning only two sizes of carbon trims; the 1 Kw lamp was capable of burning only one type of carbon trim; and the Suprex permitted the choice of three carbon trims. The Strong Mighty 90 and Super 135 afford a choice of four different and distinct carbon trims. As to the various modes of burning the carbons, the low-intensity, 1 Kw, and the Suprex could burn the various carbons in only as many fashions as there were variations in trim. The Strong Mighty 90 and Super 135 can burn the four carbon trims in a total of seven separate manners. Three of these four trims can be burned in a manner so as to be consumed either in the range of 30 to 55, or 45 to 75 minutes per positive carbon. This versatility affords the theatre owner and projectionist an opportunity to attain any desired degree of cost of operation, screen illumination, or burning time — a

TABLE 1. Data relative to lumen output at given arc amperage and voltage for Strong projection arclamps.

RANGE OF TOTAL SCREEN LUMENS: NO SHUTTER, NO FILTER, F:2 COATED LENS (See notes 1, 2, and 3 below)	ARC AMPERAGE RANGE	ARC VOLTAGE RANGE	RANGE OF CONTINUOUS BURNING TIME WITHOUT RETRIM (In minutes)	CARBON		GEAR REDUCTION POSITIVE MOTOR	POSITIVE CARBON DRIVE ROLLER ASSEMBLY	NEGATIVE LEAD SCREW THREAD	POSITIVE CONTACTS
				POSITIVE	NEGATIVE				
15,000—19,000	75—85	50—55	75 to 45	9 mm	5/16	300:1	9—10 mm	5	9 mm
17,000—21,000	82—90	53—60	55 to 30	9 mm	5/16 11/32 — above 85 amps.	216:1	9—10 mm	5	9 mm
16,000—19,500	90—100	55—62	75 to 45	10 mm	11/32	300:1	9-10 mm	5	10 mm
18,000—21,500	97—105	60—64	55 to 30	10 mm	11/32	216:1	9—10 mm	5	10 mm
18,500—22,500	110—120	60—65	75 to 45	11 mm	3/8	300:1	11 mm	6½	11 mm
19,000—22,500	115—127	57—65	75 to 45	10 mm Hitex	3/8	300:1	9—10 mm	6½	10 mm
22,000—26,000	124—135	63—70	55 to 30	10 mm Hitex	7/16	216:1	9—10 mm	6½	10 mm

NOTES: 1—Total lumens through 2.55:1 ratio aperture of standard width: 50% less; 2—through 2:1 ratio aperture of standard width: 30% less; 3—through CinemaScope aperture: approximately 22% more.

Greetings

from

GENERAL THEATRE SUPPLY COMPANY, LIMITED

Toronto • Canada

- BRANCHES:

HALIFAX, N.S.
SAINT JOHN, N.B.
MONCTON, N.B.
MONTREAL, P.Q.
OTTAWA, ONT.
BRANTFORD, ONT.
CHATHAM, ONT.
NORTH BAY, ONT.
WINNIPEG, MAN.
CALGARY, ALTA.
VANCOUVER, B.C.

Flexibility Marks Modern Arclamps

By ARTHUR J. HATCH
The Strong Electric Corporation

GENERALLY SPEAKING, if the historical development of a class of devices is studied, it is found that as the flexibility of the device is increased a compromise in quality, efficiency, or operational ease is necessary so that the flexibility goal can be achieved. This has not been so, however, in the instance of the Strong Mighty 90 and Super 135 projection arc lamps, whose range of flexibility has been increased in many ways without compromising with quality.

As an example, in the low-intensity lamp the range of carbon burning rates from the highest value to the lowest value was approximately a 1.3:1 ratio. The Suprex type of arc had a burning rate range of 1.75:1; while the 1 Kw type of lamp had no range whatever, since it had to burn at the one fixed current for which it was designed.

Wide Flexibility in Light Level

The Strong Mighty 90 and Super 135, however, have an overall carbon burning rate range ratio of 2.5:1. Converting this to inches of carbon per hour, this means that these new type lamps are capable of burning as slow as 13 inches or as fast as 32 inches of carbon *per hour*. Correspondingly, the arc current range of the Mighty 90 and Super 135 is 1.8:1 as compared with a 1:1 ratio in the instance of the 1 Kw.

In addition to the flexibility in burning rates, there is of course a corresponding flexibility in the amount of light that can be produced by the Strong Mighty 90 and the Super 135. From the lowest to the highest light level there is a range of 1.7:1 ratio; whereas in the Suprex the ratio runs 1.55:1; while the 1 Kw, with its fixed burning rate, had a fixed light output. The low-intensity lamp, due to the fact that the intensity of the crater remains approximately the same through quite a range of carbon sizes and currents, has a light range ratio of only 1.2:1.

Most low-intensity lamps were capable of burning only two sizes of carbon trims; the 1 Kw lamp was capable of burning only one type of carbon trim; and the Suprex permitted the choice of three carbon trims. The Strong Mighty 90 and Super 135 afford a choice of four different and distinct carbon trims. As to the various modes of burning the carbons, the low-intensity, 1 Kw, and the Suprex could burn the various carbons in only as many fashions as there were variations in trim. The Strong Mighty 90 and Super 135 can burn the four carbon trims in a total of seven separate manners. Three of these four trims can be burned in a manner so as to be consumed either in the range of 30 to 55, or 45 to 75 minutes per positive carbon. This versatility affords the theatre owner and projectionist an opportunity to attain any desired degree of cost of operation, screen illumination, or burning time — a

TABLE 1. Data relative to lumen output at given arc amperage and voltage for Strong projection arclamps.

RANGE OF TOTAL SCREEN LUMENS: NO SHUTTER, NO FILTER, F:2 COATED LENS (See notes 1, 2, and 3 below)	ARC AMPERAGE RANGE	ARC VOLTAGE RANGE	RANGE OF CONTINUOUS BURNING TIME WITHOUT RETRIM (In minutes)	CARBON		GEAR REDUCTION POSITIVE MOTOR	POSITIVE CARBON DRIVE ROLLER ASSEMBLY	NEGATIVE LEAD SCREW THREAD	POSITIVE CONTACTS
				POSITIVE	NEGATIVE				
15,000—19,000	75—85	50—55	75 to 45	9 mm	5/16	300:1	9—10 mm	5	9 mm
17,000—21,000	82—90	53—60	55 to 30	9 mm	5/16 / 11/32 — above 85 amps.	216:1	9—10 mm	5	9 mm
16,000—19,500	90—100	55—62	75 to 45	10 mm	11/32	300:1	9-10 mm	5	10 mm
18,000—21,500	97—105	60—64	55 to 30	10 mm	11/32	216:1	9—10 mm	5	10 mm
18,500—22,500	110—120	60—65	75 to 45	11 mm	3/8	300:1	11 mm	6½	11 mm
19,000—22,500	115—127	57—65	75 to 45	10 mm Hitex	3/8	300:1	9—10 mm	6½	10 mm
22,000—26,000	124—135	63—70	55 to 30	10 mm Hitex	7/16	216:1	9—10 mm	6½	10 mm

NOTES: 1—Total lumens through 2.55:1 ratio aperture of standard width: 50% less; 2—through 2:1 ratio aperture of standard width: 30% less; 3—through CinemaScope aperture: approximately 22% more.

flexibility which had long been desired but never attained with previous types of lamps.

The accompanying chart (Table I) illustrates the flexibility of these modern lamps and shows the few simple changes needed to cover the range of operation.

Control Settings Enormously Simplified

As stated previously, these increases in flexibility have not compromised the ease of operation of these new Strong Lamps. As a matter of fact, the control settings necessary to attain the various adjustments through the increased range have been simplified. Only one control is required for selecting any amperage within the range of the particular mode of operation. While the 1 Kw and low-intensity had only one control, the burning range was strictly limited to 1.1 and 1.3:1 ratio. Although the Suprex lamps afforded a comparatively wide burning rate ratio, the operation was complicated by the necessity of adjusting two separate carbon feed rate controls.

This simplification of control was made possible by Strong's development of a bimetal control tube. This Lightronic tube controls the carbon feeding rates so as to automatically hold the carbon crater at the *exact* focal point of the reflector at *all* times. By this control of the positive and negative motor feed speeds the arc can be burned without constant attention by the operator.

Unique Simplification of Controls

With the new screen presentation techniques further complicating the job of the projectionist, he has been particularly appreciative of the simplified control of these new Strong lamps. The projectionist, furthermore, is quick to see the advantages of the unitized component design which affords such wide versatility in these lamps. He can in a matter of moments and right in his projection room effect the simple changes necessary to attain the correct light requirement for any of the various screen presentation techniques. It is even possible for him to quickly and easily obtain the light requirements for two different types of techniques on the same program, even though there is a 60% difference between their light requirements.

Simultaneously with the widening in the flexibility of operation of these new arc lamps, Strong also designed rectifiers of correspondingly increased range. For example, the new Strong selenium rectifier has a range of from 90 to 135 amperes, which means that with a single piece of power conversion equipment the projectionist can fulfill the arc power requirements of the various systems of screen presentation.

★ ★ ★

The Future of Theatre Tv

By NATHAN L. HALPERN
Theatre Network Television, Inc.

IT seems strange that the motion picture industry, painfully aware of the inroads upon its audience, has been slow to seize upon a simple method of turning the techniques of television to its own advantage and profit. This could be accomplished if more thought were devoted to the vast and unexplored possibilities of theatre Tv.

In the last five years, Theatre Network Television has presented 69 closed-circuit telecasts of sporting and other events, but even now, despite the great success of the Rocky Marciano-Ezzard Charles heavyweight championship fight telecast, there still are theatre men who do not understand the possibilities of closed-circuit television.

Cost Factor Vital for Network Tv

Tv network executives fret over the tremendous cost of putting on quality shows without some method of easing the burden on advertisers by charging the listener a fee or some kind of "admission" charge. Closed-circuit theatre Tv can solve this problem for many types of shows and also put the motion picture exhibitor in a position to acquire new box-office revenue. It may be that the customer must leave his home in order to view a theatre Tv event, but it is also true that a much larger and more dramatic picture can be presented in the theatre than on the face of a comparatively small Tv tube.

Furthermore, there is another use to which theatre Tv circuits and equipment can be put, offering a new and almost untouched field for the motion picture theatre. This is the practice of connecting sales meetings, conventions and similar gatherings at distant points by means of closed-circuit Tv, rather than by the customary but time-consuming and expensive process of gathering the interested parties from all over the country. This is what we call "Tele-Sessions."

"Tele-Sessions" in a Phenominal Spurt

An outstanding example of how Tele-Sessions can make wide use of theatre Tv equipment and motion picture auditoriums on a nation-wide basis is the coast-to-coast sales meeting that we recently organized for the Dodge Division of the Chrysler Corp. Dodge dealers and salesmen in 29 cities were given a preview of the 1954 sales and advertising campaign. This program originated from television studios in New York and featured top Dodge executives in addition to Tv and radio personalities sponsored by the company.

Another very successful telecast of this type was sponsored by National Dairy Products Co. This firm reasoned that if Tv was effective in selling customers on its product in the home, closed-circuit Tv in the theatre, aimed solely at its dealers and routemen, would be effective in selling them on the company's product.

Produced by the Tele-Sessions division of TNT, this program originated in the Center Theatre in New York City and was piped to selected theatres in all Sealtest markets. It was a 1¾-hours show which started at 10 A.M., used 12 sets and required about 100 crewmen and 50 performers.

Soaring Craft Employment Possibility

Tele-Sessions is a fast-growing business that can provide increased revenue for the motion picture theatre, help keep theatres open and increase job hours for projectionists and other technicians. This union (the IATSE) and its membership has always shown an awareness of the potential importance of theatre Tv, and their

(Continued on page 46)

CONGRATULATIONS

to

THE UNSEEN SHOWMEN

of the

INTERNATIONAL ASSOCIATION of THEATRICAL STAGE EMPLOYEES

and

MOVING PICTURE MACHINE OPERATORS

of the

UNITED STATES AND CANADA

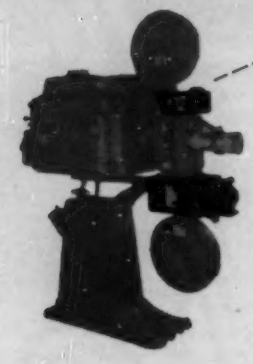
Motion Picture Film Department

EASTMAN KODAK COMPANY

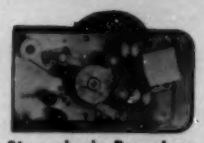
Rochester 4, N. Y.

Westrex Corporation announces for the Stereophonic Era

FOR STUDIOS EVERYWHERE



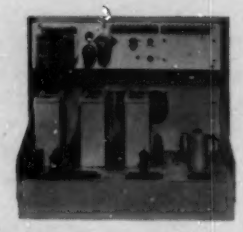
The Westrex R9 Stereophonic Reproducer (Magnetic) and R7 Photographic Reproducer.



R9 Stereophonic Reproducer (Magnetic) features the Academy Award winning hydro flutter suppressor, a tight film loop, and double flywheels.

R7 Photographic Reproducer assures the best reproduction from variable area and density prints. Special noiseless timing belts that neither slip nor stretch are featured for the first time.

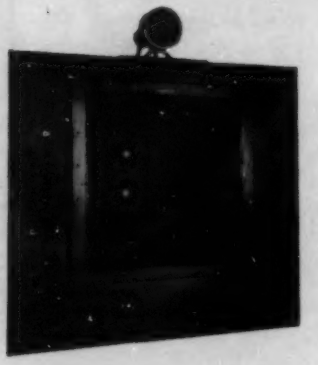
FOR THEATRES OUTSIDE U. S. A. AND CANADA



This Integrator is required for Perspecta Sound multi-channel reproduction from a standard photographic sound track on which have been superimposed control frequencies.

THE WESTREX Multi-Channel and Single Channel Sound Systems

Westrex offers a complete line of newly designed theatre sound systems for multi-channel magnetic (such as Cinema-Scope), multi-channel photographic (such as Perspecta Sound), and single channel reproduction (standard photographic). When installed and serviced by Westrex engineers, these systems assure the finest performance at the lowest overall cost.



The Westrex T501A Stage Loudspeaker Assembly features the newly designed Acoustic Lens.

The Westrex Amplifier Cabinets provide up to four channels for magnetic or photographic reproduction.

The Westrex T502B Stage Loudspeaker Assembly was designed for larger motion picture theatres.

Research, Distribution and Service for the Motion Picture Industry

Westrex Corporation

111 EIGHTH AVENUE, NEW YORK 11, N. Y.

HOLLYWOOD DIVISION: 6601 ROMAINE STREET, HOLLYWOOD 38, CAL.

FORMERLY WESTERN ELECTRIC EXPORT CORPORATION

VistaVision: Basis for a World-Wide Standard of Presentation

By LOREN L. RYDER

Head of Engineering and Recording
Paramount Studios, Hollywood

ONE can always measure a projection throw, but how far can one throw a projectionist? Let a small framing error exist, allow a few frames to run out of focus, or miss a changeover—and the projectionist is a bum. Yet, have a complete run-through with everything in perfect balance and the projectionist hardly gets a nod. So it is behind the scenes.

Actually, projection room operation is so important that no motion picture performance could be completely successful without the talent and experience of today's projectionist. Beset as some of them have been with a multiplicity of new methods, and having been confronted with problems like 3-D, stereophonic sound, various aspect ratios and the like, it is a wonder that they keep their sanity.

World-Wide Theatre Survey Underway

But projectionists almost everywhere take particular pride in their work, their equipment and its performance. This came especially to my notice during a recent tour of theatres in Europe and Canada where, as in the United States, they take equal pride. In theatre areas in Germany as well as Italy and, to some extent, in Belgium where there has been much rebuilding since the war, projection rooms are most modern and provide fine operation facilities. The greater part of the equipment has been patterned after our own and it is well made by fine craftsmen.

Paramount is now in the process of making a world-wide survey of theatres, and in addition to my trip throughout Europe, my assistant at the studio, Louis H. Mesenkop, is in the Orient, while Frank La Grande of the New York office is checking the South American territory. In each case it is found that the majority of projectionists have great respect for their positions. This is gratifying and indicates a sincere effort to provide the best possible picture presentation.

With the knowledge that we are part of a world-wide entertainment activity, and since a good percentage of revenue is derived from foreign showings, it is important that we understand and assist wherever we can to keep our product playing well, since this extra revenue makes it possible to continue making the high quality pictures exhibited in domestic theatres.

In my travels in the United States, Canada and Europe, wherein I am working for large-screen presentation, I have oddly enough found many theatres in which we have more difficulty getting sufficient width than height. There are a great many narrow houses where proscenium width is sharply limited, while interior height is ample. This form accommodates the standard picture very well. It does present some problem however, in adapting for a wide-screen showing.

The principle of VistaVision is illustrated here. The human eye, everyone agrees, is constructed in such a way that its sharpest resolving power can be focused only on a relatively small area of direct interest. The eye also sees with considerable clarity a surrounding area of comfortable viewing. Anything outside this area is in the realm of what we see when we say "seen out of the corner of the eye."

Simplification, Standardization the Goal

At Paramount we are putting a great deal of effort behind a program to simplify and standardize on a flexible basis the systems of picture making and picture presentation. To this end our VistaVision process is offered to meet the requirement of theatres large and small as well as those of limited width and limited height.

The first VistaVision-produced picture will not be introduced until sometime in October, but meanwhile, as a point of information, I should like to leave a few impressions as to the benefits that may be expected by the exhibitor. Of singular importance, it represents no special problem for the projectionist.

Any standard equipment that is normal for usual runnings can handle VistaVision prints since regular 35-mm release film with standard optical soundtrack will be supplied. Where a large screen has been installed it will be necessary to secure a different focal length lens. Otherwise, if sufficient light output is available, any theatre can present a clear, sharp image with such exceptional depth of field that any seat in the house will be acceptable. For general use, that about sums it up.

It might bear repeating, however, that the source of the VistaVision picture in this new form is from exposing

an 8-sprocket hole negative *horizontally* along the film. This bigger negative with more detail than could be photographed on the standard 35-mm size carries the same detail through reduction to release-print size and in doing so practically eliminates the annoying grain that characterizes most large screen blowups.

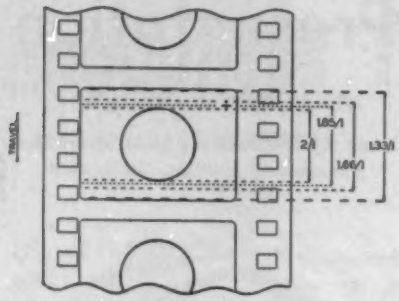


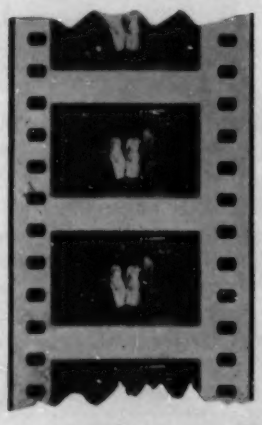
FIG. 3. VistaVision standard release print, showing the various aspect ratios from 1.33 to 1 to 2 to 1.

Incidentally, the surveys being made by the writer in the United States, Canada and Europe, as well as those being made in the Orient and South America, tend to serve another purpose. In addition to the knowledge gained as to foreign equipment, theatres and other problems, we are setting up actual demonstrations of VistaVision to acquaint our world neighbors with the practical possibilities of providing better motion picture presentation to audiences everywhere. A number of showings have already been made around the United States and a great many fine comments have come to us, especially from projectionists who appreciate the simplicity with which VistaVision films can be shown.

Good Presentation Equipment a 'Must'

Our program is designed to give the exhibitor and the projectionists all the knowledge we can accumulate with respect to presenting all picture products to the best advantage. No demands are made on any exhibitor, but we feel that to get the best results, theatres should have good equipment including good projection lenses, ample light and good seamless screens that are *both* high and wide. While forthcoming Paramount pictures can be exhibited in any aspect ration from 1.33 to 1 through 2 to 1, we strongly recommend a ratio of 1.85 to 1 for the best viewing.

Visiting in Los Angeles recently, and after viewing a demonstration of Vista Vision, Mr. Eric A. Pettersson, president of the Swedish Motion Picture Exhibitors Association, said: "VistaVision is the screen presentation process best suited to all the theatres of Europe," and added: "At the exhibitor conference in Paris on May 22-24, we had demonstrations of various aspect ratios and the consensus was heavily in favor of the 1:85 to 1 ratio. This is the picture shape which Paramount recommends and is using on all productions."



Full-size reproduction of the 35-mm release print made from the double-frame VistaVision negative. Latter is turned 90 degrees and printed down to area shown. Resultant print gives greater resolution.

During the same week, Mr. Norman B. Rydge, head of the Greater Union Theatres of Australia, declared, "VistaVision is the finest picture I have ever seen on any screen, anytime, anywhere."

As VistaVision goes abroad, Paramount feels that it is making a substantial contribution to better presentation of the mightiest of entertainment values, the motion picture.

★ ★ ★

Metal Reflectors Meet Exacting Requirements

By E. B. HEYER
Heyer-Shultz, Inc.

NOT so long ago the projection reflector was a problem only to the larger theatres and drive-ins, wherein breakage from excess heat was not only a threat to efficient performance but was uneconomical. To-day, however, more than half the theatres and practically all the drive-ins are faced with this heat breakage of their back-silvered reflectors. Wider and larger screens call for more light, and inasmuch as light and heat travel pretty much together, this means more heat with the extra light produced by the larger carbon trims.

The H-S metal reflector, introduced to the trade in 1934, is today's answer to this problem. It cannot break, will not pit, tarnish or peal, and, because of the five-year guarantee, it is economical. Projectionists find great satisfaction in its dependability, in the knowledge that this reflector will never break and let the show down.

Performance Characteristics Cited

As for "delivered screen light," in laboratory and field tests between the metal reflector and the back-silvered type of reflector, we found that the H-S "52" aluminized metal reflector rates 100%, a "selected" back-silvered reflector 97%, and the H-S rhodium metal reflector 85%.

In addition to its dependability and economy, this metal reflector faithfully reproduces on the screen the white light of the arc crater and maintains this high-quality light year in and year out. H-S metal reflectors that have been in constant use for more than 15 years are still performing efficiently.

Over a long period of time the metal reflective surface does become scratched from constant cleaning, however, and many of these older reflectors have been returned to the manufacturer for rehabilitation. In most instances

(Continued on page 46)

We who have been privileged for so many years to serve the projection craft with fine optics extend cordial

Greetings

to the I. A. T. S. E.

42nd Convention

Fine optics require fine craftsmanship—in the making and using. This combination of skill in the making and using of a precision instrument is a guarantee of mutual progress.

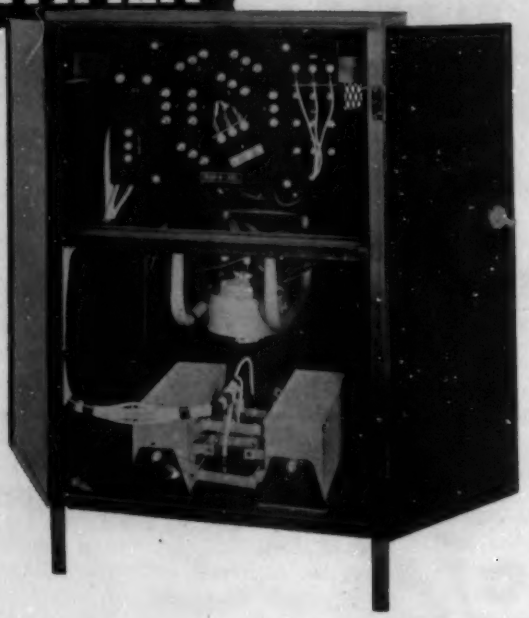
★ ★ ★

PROJECTION OPTICS COMPANY, INC.

330 LYELL AVENUE ROCHESTER 6, N. Y.

'ROBIN-ARC' 3-Phase Selenium RECTIFIER

Does the work of



TWO

Rectifiers

The new Robin Arc Rectifier gives you the performance of TWO rectifiers for the price of ONE. This versatile, low short-circuit current rectifier covers practically all present and future projection requirements. It delivers 40, 50, 60, 70, 75 amps at 32 to 40 v, or up to 100 amps at 50 to 62 v, by simply changing taps on the panel.

Robin-Arc Rectifiers are of the high-reactance type, engineered for wide screen and 3-D systems. They reduce damage to carbon craters when striking the arc, and eliminate sputtering which causes pitted mirrors. Conservative ratings assure long life and freedom from trouble. Designed by pioneers in the motion picture field to give you dependable, efficient, uniform D.C. power. Immediate delivery

ROBIN-ESCO Super-Power

MOTOR GENERATORS

A quality product built especially for motion picture wide screen projection service and is available in 60 volts—145 amperes, 80 volts—135 amperes. These units may be operated on a continuous basis at these ratings.

Write, wire or phone for details

Sold through independent supply dealers

J. E. ROBIN, INC.
Motion Picture Equipment Specialists
267 Rhode Island Avenue
EAST ORANGE, N. J.

Manufacturers of
RECTIFIERS • MOTOR-GENERATORS
SCREENS • PROJECTION LENSES

Some Questions Answered About —

Magnetic Sound Reproduction

WILLIAM BORBERG
Chief Mechanical Design Engineer

A. A. LEONARD
Applications Engineering Supervisor

General Precision Laboratory, Inc., Pleasantville, N. Y.

TESTS SHOW that the present four-track head will improve in response, and therefore in performance, during the first 100 hours of use. The performance will be nearly uniform between 100 and 700 hours. Three and three quarter million feet of film, or more, or over 700 hours of life, can be expected. Head wear will then be observed to affect one of the four tracks, most likely track No. 2, and this sound channel will deteriorate in a few hours completely.

Thus, a worn pickup head does not cause a sudden breakdown of the show, and since warning is given, replacement can be made in time. This circumstance has been experienced both in our laboratory and in theatres under actual operating conditions.

It is true that improper head adjustment can result in a drastic reduction in head life. However, as maintenance personnel have become more familiar with the criteria for proper adjustment, this factor has lost the importance it had when magnetic sound was first introduced in the theatre.

Filings, Emery and Abrasives

The sound tracks in a magnetic system consist of carefully compounded, purified, and oriented oxides of iron, supported and cemented to the film base by special adhesives. Probably the compound most nearly like that of the soundtrack is known to industry in general as "rouge." This is a material used to obtain the excellent surfaces and high polish we expect in our projection lenses. It certainly *does not* scratch.

Emery is a fine-grained impure variety of corrundum mixed with other minerals, chiefly magnetite."[1] No aluminum oxide or corrundum will be found in the soundtrack. Further, inspection of a head after use will show that the pole shoes are highly polished, usually with a better polish than the original one.

Dust, always present, contributes greatly to wear. The film moving at 1½ feet per second may also become charged and may atract dust particles. Certainly dust causes a great deal of wear. E. W. Franck, of Reeves Soundcraft Corp., makes the following statement:[2] (Journal of the S.M.P.T.E., April 1953, p. 506)

"I think it would clarify the thinking somewhat if we think of head wear as not being caused by the coating but by the dirt, the abrasive dust which is picked up. The film base iself does considerable wearing for this reason—it picks up a lot of dust and dirt. Some types of coatings will pick up more dust or dirt than others and hence wear the head more; but it is the dirt, more than the film base and more than the coatings, which does the damage."

Sprocket Characteristics, Performance

Four-track magnetic sound sprockets do have narrow teeth. This is not their only difference from the previous standard. For a long time it was felt necessary to maintain a tooth spacing to accommodate film shrinkage over a wide range. Modern film base does not shrink as much as the older types, therefore the diameter of the new sprockets has been increased slightly to permit the pitch or spacing of the teeth to be increased. This results in the teeth entering and leaving the film perforations with less rubbing or "picking."

Tests have been run, and proof is available, that film with standard perforations run on new narrow-tooth sprockets will outlast standard film on old sprockets. Of course, the old wide-tooth sprockets could be increased in diameter, too, but the change to the narrow tooth and greater diameter gives essentially the same increase in film life. We refer to the statement by Dr. E. K. Carver, Eastman-Kodak:[3]

"In the very beginning, I believe that 20th-Fox realized that any new sprockets they made would have to run at least as well on film with standard perforations as the old sprockets. It turns out that if you do not increase the diameter of the sprockets, you get slightly worse results; but if you use an intermittent sprocket with a diameter of 0.953 inches, you get at least five times as good results as far as wear and tear on the film goes as you would with a 0.935 sprocket. You also get better results than if you use a 0.943 sprocket, which incidentally, is an ASA standard. The 0.953 sprocket more than compensates for any decrease in wear you might get with the narrower teeth."

Magnetic Fields Damage Soundtracks

A projector containing magnetized parts will certainly introduce some peculiar and most annoying sounds which may become a permanent part of the soundtrack. It is not difficult to de-magnetize a projector, and once de-magnetized it will stay de-magnetized unless someone places a magnet in contact with it. The de-magnetizing technique was not thoroughly understood when magnetic

sound was first introduced, and some fantastic stories, not founded wholly on fact, have been built up.

The truth is that a mechanism, sufficiently de-magnetized, will *stay* that way. No magnetic disturbances will occur. Film may be handled in the usual manner, and it may be wound and stored on steel reels without harm. Of course, it could be damaged by draping it over magnetized objects, but this will also damage it from a dirt standpoint. We assume that no projectionist would so mishandle film.

The only mechanical damage to magnetic soundtracks that has been reliably reported to us has been caused by rough surfaces, or projecting burrs, plowing grooves into the track. This would also have caused damage to film with optical sound track. Tracks 1, 2 and 3 are 0.013 inch wider than the pole-shoes of the reproducing head; track 4, however, is narrower than its pole-shoe. The type of grooving that might conceivably be caused by this unequal width of track and head has simply not been observed.

Film Stresses Not "Excessive"

The belief that the film is under excessive tension due to the penthouse reproducer is not true. The normal tension on the film between feed sprocket and upper magazine varies from about 1 to 4 ounces, this variation being caused by the changing amount of film on the upper reel.

When the film is threaded through the penthouse reproducer, the pulling force is increased by 1 or 2 ounces. The total tension is negligible in terms of film wear as compared with tension up to 20 ounces or more caused by some types of takeup mechanism.

Soundtrack Life and Performance

It is recognized that the performance of magnetic sound on 35-mm film is superior to photographic sound in frequency response as well as in dynamic range. After nine months of field experience, it can now be stated that composite 4-track magnetic sound films have repeatedly run over 500 showings and still retain their sound quality. It is well known that photographic sound tracks after a similar number of projector transits will deteriorate because of scratches, oil, and dirt in the track region.

★ ★ ★

"Unwept and Unsung"

By DR. ALFRED N. GOLDSMITH

IF the motion picture audiences were asked what the I.A.T.S.E. was, what its members did, and what would happen if there were no I.A.T.S.E., probably very few correct answers would be forthcoming. This is truly astonishing. For the I. A. is the very focus and center of motion pictures. Its members are involved in almost every step in motion pictures from production through exhibition. Their knowledge, skill, and experience are the major factors which make motion pictures possible. In a word: if there were no such organization as the I. A., there would be no such assemblages as theatre audiences!

Consider, for example, just a few of the basic tasks which the I. A. members carry out steadily and correctly, year after year, and often under unusually difficult or emergency conditions. In the studios there are endless production jobs which require I. A. technicians and craftsmen. In the theatre itself, the same requirements hold. In the laboratories and exchanges, as well, some of the tasks could not be carried out unless I. A. men were available.

These men and women are the unsung workers of the dramas and comedies which bring entertainment, happiness, and relief from the cares of everyday life to so many millions of people. In the realm of television broadcasting and theater Tv, the same condition exists, and the public again receives its airborne entertainment through the cooperation and efforts of all categories of the I. A. membership.

Always Behind, Not in, the Spotlight

All of this being the case, how does it come about that everyone knows a movie star and so few know anything about I. A. workers? One reason, of course, is that the I. A. man works largely *behind the scenes.* He is never *in* the spotlight, but rather behind it. Others may supply the glamor and excitement which makes so immediate and marked an impression on the public. But the I. A. man supplies the brain and brawn behind the show. As a genuine rather than an artificially glamorized worker, he is at a great disadvantage insofar as publicity is concerned.

Despite this lack of public knowledge and recognition, I. A. members have done a great job. Whenever a new and difficult task has been unloaded upon them, they have responded speedily and effectively. Indeed, taken by and large, rarely has any industry had such prompt, complete, and even enthusiastic support from its workers as has been enjoyed by the motion picture field.

Industry Attitude Overall Astonishing

This makes it a bit astonishing that the industry itself has not devoted more time and thought to these quiet men behind the scenes. It is easy enough to understand why the audience does not know of them. After all, the average theatergoer has little idea of what it takes to produce a motion picture and to deliver it exquisitely clear, in brilliant color and with natural sound, on the theater screen. The methods of the IA workers are fairly technical and complex.

Similarly, it is natural that the public itself knows little of the I. A. and its place in the field. And, in general, the legislators have as incomplete or even incorrect information as does the general public in these matters.

But it is much more strange that the industry itself, including its skilled commercial executives, seems to have only the sketchiest information concerning the great group of skilled technicians which makes the industry possible. Indeed, at times it seemed almost as if the industry were not particularly interested in the

(Continued on page 45)

Why Strong Lamps ARE USED WITH MOST CINEMASCOPE PRESENTATIONS

Greetings to Our Friends of the IATSE from the boys at Strong

Strong Lamps Are Different Because

ONLY STRONG HAS A LIGHTRONIC CRATER - POSITIONING SYSTEM

A sincere effort has been expended to the end of attaining near perfection in the presentation of this new projection technique. Best possible screen lighting has been a major objective — the most light, evenly distributed, of constant intensity and unchanging color value.

These exacting high standards have been realized with the development of Strong's exclusive Lightronic crater-positioning system which automatically maintains the position of the positive arc crater at the EXACT focal point of the reflector. Manual adjustments, which at best lead to uncertain results, have been made entirely unnecessary.

The positive and negative carbons are advanced by separate motors, the speeds of which are governed by the Bi-metal Lightronic Tube. Once the arc has been struck, the crater position and gap length are maintained automatically.

That's Why ONLY Strong LAMPS ARE USED ON MOST CINEMASCOPE INSTALLATIONS

THE STRONG ELECTRIC CORPORATION

"The World's Largest Manufacturer of Projection Arc Lamps"

31 CITY PARK AVENUE TOLEDO 2, OHIO

Please send free literature on Strong Super "135" and Mighty "90" projection lamps.

NAME .....

THEATRE .....

STREET .....

CITY & STATE .....

Send today for full details on the Strong Super "135" and Mighty "90" projection arc lamps.

Evolution of the Simplex Projector

By EDWARD B. GARRISON

THE BASIC requirements of machine fitting placed the thousandth of an inch as the limit of latitude, and on important parts ten-thousandths of an inch." This was the credo of Francis B. Cannock, who, together with Edwin S. Porter, laid the foundation for the design and manufacture of the precision instrument which is known throughout the world as the Simplex motion picture projector.

But preceeding the Simplex projector were a series of events which left a deep impress on motion picture technological development and contributed substantially to the present structure of International Projection Corp. These events stemmed from the brain, hand and heart of Nicholas Power. Posessed of great inventive ability and an agile and far-seeing business talent, Nicholas Power built his first projector, the Peerlescope, in 1902 in a little shop on Nassau St. in New York City.

This projector was equipped with a gaslight source and was belt-driven directly from the rim of the crank-wheel. The film, upon passing through the projector, dropped into a cloth bag which, however, was soon replaced by a sheet metal box. As much as 3000 feet of film was run into this box in a loose heap, with the ends of each reel left hanging out of the opening to be retrieved later for rewinding.

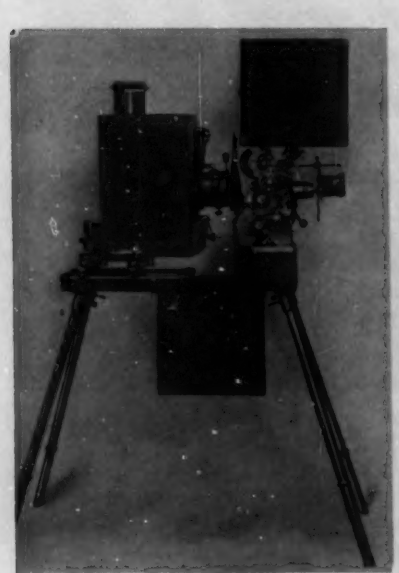
Contemporary with the Powers projector were the Edison Kinetoscope, the Lubin, the Dressler, and the Vitascope (built by Thomas Armat and reputedly the first loop-forming mechanism). There were several other "-graphs" and "-scopes" marketed during the ensuing five years, among which was the Standard projector.

All this equipment was extremely crude, by present-day standards althought it was used with fair success in the "store shows" of those days. Nicholas Power, however, with his great flair for this type of apparatus, quickly replaced model after model, each succeeding one being a great improvement over its predecessor.

Basis for Success of the Powers

From the beginning Nicholas Power began to build up a strong patent wall around his developments, being the first to invent (1904) a satisfactory device for centering the picture in the aperture while the projector was operating, thus obviating the need for shutting down the equipment and showing a slide very common in those days: "One minute, please, to frame picture." Two years later Power obtained two other valuable patents covering the takeup device, or method of "rolling a film on a lower reel without tearing the film during the operation," and the basic patent covering upper and lower film magazines having fire-prevention film valves.

These three patents were the basis for the subsequent success of Nicholas Power and his successor, Nicholas Power Co., a corporation formed in 1907. Between 1904 and 1922 Nicholas Power obtained 57 patents covering the design and construction of important improvements in Power's projectors Nos. 4, 5, 6, 6A, and 6B, the latter being the last one manufactured. These patents covered



The famous Powers No. 6 Cameragraph (1909) having a solid-pin movement and employing the then conventional straight arc for illumination.

The 6B was the last Powers made (1920) utilizing a roller-pin cross movement. No. 7 Powers was designed but was never manufactured.

Old standby through the years — the Regular Simplex (1910). Note old framing lever. Light source shown here is the first McAuley reflector lamp.

many important devices, among which were means for:

1. Preventing the breaking of film between the intermittent movement and take-up sprocket. 2. An automatic fire shutter interposed between the film and he illuminant. 3. Further developments and improvements in film magazines and fire-prevention means therefor.

The latter three patents, along with many others, were issued prior to 1914 and apply to the Powers Nos. 4 and 5 projectors.

About 1909 a very important development took place in projector construction—the introduction of the Powers No. 6 Cameragraph which embodied a fundamentally new principle of intermittent movement whereby the film was moved down from frame to frame successively for projection, the period of movement being obscured from the screen, and one picture at a time being exposed to the illuminant; the exposure and cut-off were brought about by a revolving shutter synchronized with the intermittent and this synchonism being maintained regardless of the framing position of the intermittent assembly.

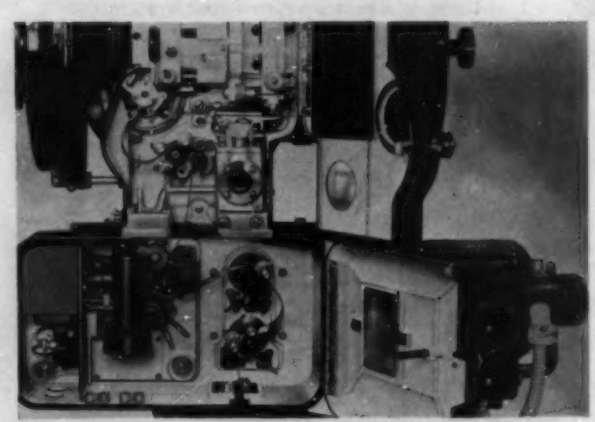
This new movement was very much faster in its pull-down period than anything previously attempted, thus allowing a longer exposure to the screen and, therefore, greater illumination. It was this improvement which forced other early competitors from the market.

While theoretically practical, the first model of this new-type movement was not altogether successful, due to mechanical difficulties; but it was quickly replaced with a device of similar construction which constituted the movement of the most recent and wholly successful Powers projector.

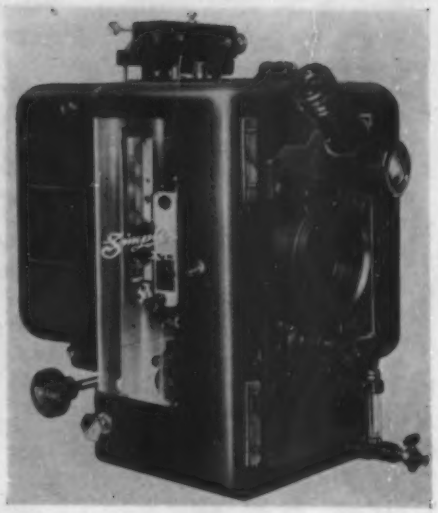
The Powers 6A Marked an Epoch

The Powers 6A projector was marketed in 1911, this being an all-metal equipment including stand, lamphouse, magazines and the No. 6 mechanism, thus eliminating the flimsy wooden tableboard. The 6A enjoyed tremendous success for many years, the period 1912 to 1916 witnessing many major projector advances of which the following are especially noteworthy:

A new stand or pedestal with a new takeup device and means for making what had by this time become necessary adjustments; a new and sturdier lamphouse to handle the increasing demands for higher currents for illuminants; motor-driving means, the fire authorities having then begun to allow the use of such drives; a combination of fire-prevention devices; a mechanical variable-speed control and motor assembly; film tension shoes for projector gates whereby the film was held accurately in the focal plane for proper screen focus of the image; an improved method of framing the image; a lamphouse unit for use with the highly efficient incandescent lamps developed about that time, and a fundamentally new principle in automatic speed-controlling mechanism for use with projector drive motors.



The Simplex E-7 with soundhead attachment.



The X-L projector mechanism, latest in the Simplex-International Projector Corp. series of projectors.

Powers Awarded Basic Patents

Many other patents were issued to Nicholas Power Co., including a great number covering a complete motion picture projector embodying numerous basic ideas and improvements. This new projector was to be known as the Powers No. 7; but it was never put into production. The year 1911 saw only two active projector manufacturers; but beyond the horizon was brewing a storm of formidable proportions, the first faint clouds of which were barely visible. The Simplex projector was on the way.

In 1909 two new organizations had entered the field: the Precision Machine Co. which took over the inventions of Francis B. Cannock which were represented by the Edengraph, forerunner of the Simplex projector; and the American Motion Picture Machine Co., which developed the Standard projector. The latter company failed in 1913, however, leaving but three surviving projector manufacturers: Nicholas Power, Precision Machine Co., and Enterprise Optical Co.

First Simplex Scored Many Advances

The Precision group lost no time in giving strenuous and persistent battle to Nicholas Power Co., and after only three years of intensive competition the Simplex projector was firmly established on the market. Thus was established the basis for the famous Power-Simplex feud, with the proponents of each projector proving ready literally at the dropping of a word to vociferously, and often militantly, defend the projector of their choice.

The Simplex projector was of entirely different design

(Continued on page 43)

PERSPECTA—the All-Purpose Recording and Reproducing Sound System

By ROBERT FINE
Fine Sound, Incorporated

WITH the introduction of wide-screen techniques and the warm acceptance by the public of these dramatically more effective pictures, a problem was posed as to the enhancement of these presentations through the use of directional or stereophonic sound.

The first of these pioneering efforts in stereophonic sound quickly answered the question as to the distribution of stereophonic sound with a larger picture presentation. It was overwhelming; yet it proved that both direction and volume enhancement with the enlarged picture added tremendously to the dramatic effectiveness of the over-all subject material. Several systems have been used, each of which possess advantages and disadvantages. In an effort toward industry standardization, as well as minimizing costs for producers and exhibitors, Perspecta Stereophonic Sound was developed.

"Standard" Stereophonic Sound the Aim

The development was based upon observations of what constituted stereophonic sound as we heard it in the theatre and how it could be achieved through the use of standard or non-recording mediums in such a way as not to limit the use of the product only to theatres equipped with special devices for reproduction.

It was obvious that magnetic-striped film could not be played in a theatre without the proper type of reproduction heads and that it would be necessary in a general run of a double feature with associated short subjects and newsreels for the projectionist to be constantly aware of the type of product so that he could switch between magnetic reproduction and standard optical reproduction, creating somewhat of an operational problem. Also, this product could not be distributed as before because of the need of special equipment, thus a theatre equipped for magnetic reproduction was limited to fewer sources of product.

A Completely Compatible Optical Track

The development then narrowed itself down to creating an optical track that would be completely compatible encompassing some form of information so that if used with the Perspecta Stereo Integrator equipment (Fig. 1) it would reproduce with all the advantages of stereophonic sound both in quality and direction, and that if the same track were run on a *standard* projector in an *average* theatre it would reproduce as a standard single-channel normal optical track.

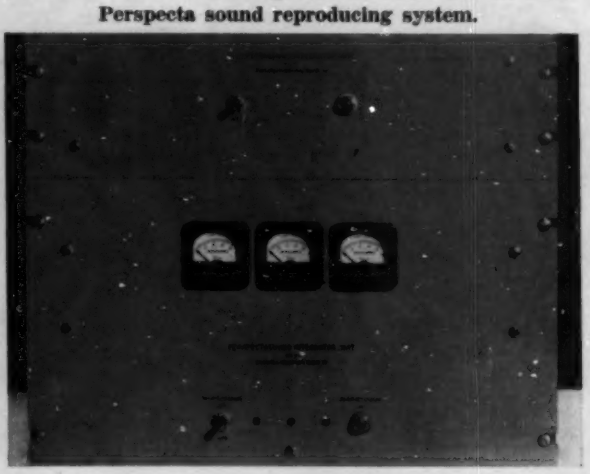
There have been many comments and discussions as to the merits of optical *vs.* magnetic track. With much misinformation circulating, there exists general confusion. There is no doubt that optical track can efficiently encompass the frequency range necessary to create life-like reproduction of sound through the Perspecta stereo system. If the optical track be properly reproduced, it is generally almost impossible on an audience level to differentiate between Prespecta stereo sound and any 3- or 4-stripe magnetic system. Here again it is necessary to keep in mind that this same track is completely compatible and can be played either as a single standard track or in conjunction with the Perspecta stereo sound Integrator as stereo reproduction.

How The System Works

The Perspecta system utilizes a single optical soundtrack. In addition to the audible sound, three subaudible low-frequency control signals are recorded. The variance in amplitude of each low-frequency control signal controls the volume of reproduction through the corresponding amplifier horn channel.

Initial tests indicated that it was possible to introduce low-frequency controlling signals recorded simultaneously, with the relative complex wave forms, and still maintain quality audio, and at the same time leave sufficient energy of the controlling signals to operate over a wide range of volume control. It was then necessary to ascertain the maximum low-frequency level that could be

FIG. 1. Front view of Integrator Unit used for the Fine Perspecta sound reproducing system.



used without sacrificing compatibility or introducing intermodulation distortion.

Standards for Low-Frequency Control Track

The first series of tests comprised low frequency-control signals in varying amplitudes. First, singular signals, and then varying combinations of the three basic control signals for observation of any in-phase additive conditions that might cause either amplitude modulation of the complex waveform or an undue amount of harmonic distortion. After a survey in a number of theatres, the standards of control signal levels were set as they now exist. The standards are that:

The maximum amplitude of any control frequency shall not exceed 16 db below a 100% constant tone level based on area film recording with a 76-mil peak-to-peak voltage. There is a test reel that incorporates a series of test signals to align the Integrator equipment, consisting of combinations of control signal and 100% tone modulation at a 16 db differential. This calibration represents the maximum reproduction volume level control that would be apparent in the theatre when the control signal reaches this 16 db point.

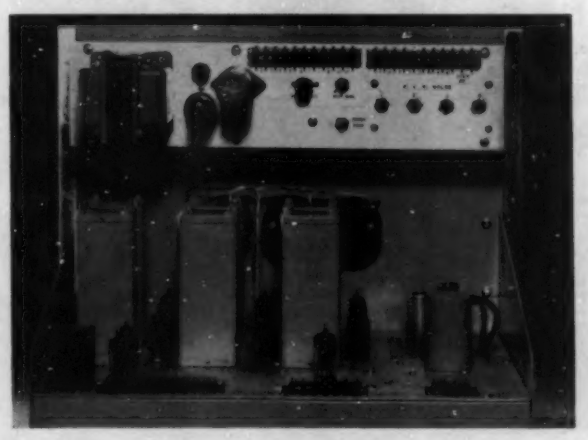
In mixing or scoring the film, to allow for the normal dynamic range of the film track, it was found desirable to set the average mixing control signal amplitude 5 db below its maximum level or at approximately minus 21 db with reference to 100% tone. This allows leeway for further dynamic enhancement beyond the limitations of the optical recording for effects and musical sequences.

"Perspecta" Not a Switching System

It should be emphasized that Perspecta stereo sound is *not* a switching system. Continuously varying amplitudes of control govern the output level of each of the three horn channels, thus giving an extremely smooth directional effect without jump between channels.

In the final release track, then, the average amplitude of any of the control signals does not exceed 21 db below 100% tone, except for effects or music sequences, thus insuring a greater compatability of the Perspecta release track. The generation for the control signal, as installed at M-G-M, Warners and Paramount, consists of three master oscillators, the frequency of which is set with the use of precise observations on an oscilliscope against the 60-cycle line frequency. One set of master oscillators can supply all the re-recording and mixing channels through the use of appropriate bridging amplifiers or pad networks.

FIG. 2. Rear exposed view of components of the Integrator Unit of the Perspecta sound system.



The Integrator, the heart of the system to which we have been referring (Fig. 2) works as follows:

It incorporates a pre-amplifier with enough gain to accommodate any type of output level from any type of projector. The output of this pre-amplifier is fed into two filters. On the audio side, a 63-cycle, high-pass filter system and booster amplifier feeds a buss connecting to the inputs of the three controlled push-pull stages, so that the same audio signal is available at the input of each of the three controlled amplifiers.

A 63-cycle, low-pass filter system with another booster amplifier feeds the inputs of the three band-pass filters. This low-pass filtering removes the largest component of complex audio program, and primarily the only intelligence at this point is a composite of the control signals. Each of the band-pass filters is unique in the following features:

Physical Size:

A great deal of engineering has been done to reduce the size of these low-frequency units.

Electrical Response:

They have a 2-cycle bandwidth, to allow for a variation up to 4% in the speed of the projector. At the same time, the filters produce a 20 db rejection at the 5-cycle point between each of the channels to give adequate separation between control channels.

Each of the low-frequency control signals after acceptance by its corresponding band-pass filter is again amplified and sent through an appropriate coupling to a diode rectifier system. The amount of rectified voltage appearing on the output of the diode rectifier sections is linearly equivalent to the amplitude of the low-frequency control signal that was introduced to the input of the band pass filter.

It is obvious, therefore, that the unit operates on a 1-to-1 ratio through its controlled range. Simply expressed, this means a 1 db change in output level of the controlled push-pull amplifier section. This insures a smooth change in volume when changing directional characteristics by variance of control signal amplitude from one band pass section to another.

Novel Automatic Switching Device

The unit also incorporates an auto-switching device, which is necessary to complete the pattern of compatability. This auto-switching circuit performs as follows:

The presence of any control signal of normal amplitude for a period in excess of 7 seconds activates a relay system which connects the output of each of the rectified components of the low-frequency controlling signals, to control the bias of its corresponding push-pull controlled amplifier stage.

Absence of all low-frequency control signal for 1½ seconds causes the auto-switching unit to deactivate the relay system. Under this condition, a bias equal to the cut-off value of the push-pull stages is applied to the two

(Continued on page 41)

From Magic Lantern to Giant Screen, Stereo Sound

By H. T. MATTHEWS
Motiograph, Incorporated

AS MOTIOGRAPH nears its 60th anniversary, this pioneer motion picture equipment manufacturer can proudly share that occasion with the entire industry, having made its start in the mid-'90s, shortly before the first commercial film showing in America. It was in that period, too, that the Optigraph, the first of a long series of projectors, was introduced by this company.

In the years since, Motiograph has developed a complete line of sight-and-sound projection equipment. Each new model produced down through the years was evolved through efficient engineering, experienced workmanship and well-made parts.

"Entertainment Packet" Including "Magic Lantern"

It was in 1896—58 years ago—that motion pictures were first shown in a regular theatre. The curtain rose on the famed nickelodeon. Nearly a hundred years of diligent endeavor had made this nickelodeon possible. In this setting Motiograph made its bow by introducing the Optigraph, first of a long series of projectors.

Alvah C. Roebuck, native of Lafayette, Ind., and the Roebuck of the famed mail order house, conceived the idea of offering an "entertainment outfit" by which the purchaser might liven up church social activities and at the same time earn some extra money for himself and the church.

In 1896 this offer included a "magic lantern," several sets of slides, a supply of advertising posters, admission tickets: and a book of instructions. The idea was a great success, orders poured in from all parts of the country to Enterprise Optical Mfg. Co., predecessor of Motiograph, Inc. Also, plans were being made to "shoot" the Corbett-Fitzsimmons championship fight at Carson City, Nev., and also a reenactment of the Oberammergau Passion Play, done in New York.

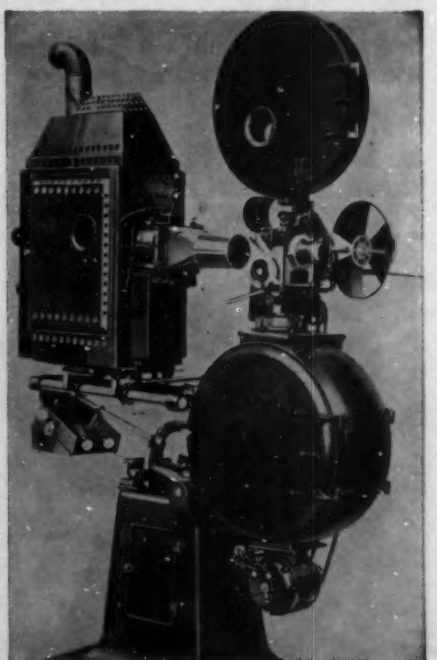
Viewing all this activity, Roebuck envisaged a tremendous future for this new entertainment medium. Consequently in 1898 he set upon the production of what has since come to be recognized as the first practical motion picture projector—the Optigraph.

But the Optigraph was not to remain long in the state of its first model. Improvements were many and rapid, including a redesigned mechanism, and efficient

The First 20-Year Span in the Development of Motiograph

Model 1A Motiograph (1908) had a strong cast iron base, instead of small tubular legs, and an improved shutter. The first truly commercial Motiograph unit.

Below (center cut): the Optigraph, one of the first practical motion picture projectors and forerunner of the Motiograph series of projectors.



Model E Motiograph (1916) with motor beneath the lower magazine operating the mechanism by belts. Positive speed control, and new condenser mount.

framing device and a takeup reel which provided more safety and greater film protection.

Roebuck's vision was taking shape. National news events were now being filmed, among them the funeral procession for the victims of the U. S. S. Maine, and the embarkation of Teddy Roosevelt's famous Rough Riders for Cuba.

IA Mechanism Motio's Real Bid for Prominence

Motiograph's real bid for a prominent position in the theatre equipment field was made in 1908, when Roebuck produced his Motiograph Model 1A, well-engineered and even today considered a high-grade projector. The 1A boasted an improved shutter, a very accurate Geneva movement, and a strong cast-iron, circular-base pedestal, instead of small, tubular legs. The crank and stereoptican arrangement of the earlier models was retained.

Roebuck's constant desire to maintain a margin of superiority by means of improvements and new inventions resulted in a new projector, the Model D Motiograph. In a short space of time, he received nearly 100 successful patents. One of the many changes incorporated in the new models included the first double shutter of the Model D.

The next epoch in Motiograph history was the Model E, produced in 1916. Among the principal new developments of this projector were the positioning of the motor beneath the lower magazine. This operated the mechanism by belts and was provided with a speed control that made speed variation absolutely mechanical and positive. A newly-designed condenser mount enabled removal of the lenses without touching them. Both the stand and the magazines embodied revolutionary improvements in design.

The Model E appeared at a time when theatremen were becoming more projection-conscious. They were paying better prices for better pictures like Griffith's "Intolerance" and Charles Chaplin's "The Floor Walker." By 1917 there were 17,000 theatres in America devoted to the presentation of motion pictures, and the end of World War I further accelerated the building of larger and better theatres.

Model F Projector Still Serving Many Theatres

The year 1921 marked two great achievements: Rudolph Valentino's "The Four Horsemen of the Apocalypse," which did a steady and phenomenal business for years, and the introduction of Motiograph's Model F, which set new standards for steady projection. This projector still is giving service in a number of theatres today.

For the first time, the mechanism was enclosed, giving the projector a decidedly improved appearance. There was a better lens arrangement, removable bearings, and a variable-speed gripping disk. While it was still the front type, the shutter now had two blades, as well as a timing device adjustable while the machine was in operation. The base had been improved for tilting, the magazines provided with peepholes.

When sound came in, Motiograph was ready with its new Model H. This projector introduced the first rear-shutter and the first double-shutter, providing a far more brilliant picture and resulting in less heat at the aperture. It also introduced Motiograph's Mirrophonic sound system, which reproduced sound on film and Vitaphone records. The projector included a pinion framer, operated by means of a wheel located behind the lower magazine, and a base which had been redesigned to meet the requirements of sound equipment.

New reflector arc lamps which, burning 15 amperes and projecting more light than had heretofore been possible with vertical condenser-type arcs burning 50 amperes, were introduced by a number of projection arclamp manufacturers. This better light source, together with Motiograph's improved projectors, vastly improved the screen image.

Present Management Took Over in 1935

In 1935, Fred, Thor and Doug Matthews took over the interests and active management of Motiograph, and one of their first accomplishments was the development of the Model HU projector.

In 1936, numbering such productions as "San Fran-

(Continued on page 50)

TESMA and the Projectionist: a Common Interest

By FRED C. MATTHEWS
President, TESMA

TESMA—Theatre Equipment and Supply Manufacturers' Association—is not as old an organization as the IATSE, although many TESMA members have served the motion picture industry quite as long as the charter members of the IA. The TESMA membership now includes virtually every manufacturer of theatre equipment.

Those TESMA members who manufacture screens, lenses, projectors, sound systems, arc lamps, generators, rectifiers and projection room accessories are particularly conscious of the contributions of IA members to the motion picture industry. The latter have contributed in many ways to industry welfare by making suggestions and recommendations to manufacturers for improvements in their products and by properly operating and maintaining projection and sound equipment in tip-top order.

New Picture Processes Pose Challenge

At the same time, and particularly in the last year, TESMA members have also contributed to the forward-looking aspect of the entire motion picture industry by making available equipment to present the new picture processes to the movie-going public. But no matter how well equipment is designed and manufactured, it takes long experience to operate that equipment properly. Manufacturers and theatre owners alike should be, and I think they are, grateful to the thousands of experienced projectionists in the ranks of the IA.

This year TESMA will conduct a gigantic Trade Show of motion picture equipment at the Conrad Hilton Hotel in Chicago from October 31st through November 4th. We hope that the many IA members will visit our show and see and compare the equipment to be shown.

★ ★ ★

3-D Movies . . . Epitaph or Prologue?

By JOHN NORLING
Loucks & Norling, Inc., New York

THREE-D film appeared at a time when the motion picture industry needed a stimulus of some sort. That 3-D was a stimulus that brought increased business is a well-established fact. Because it was such a success at the outset should have been no assurance that it would continue that way. Certainly, the industry seemed to have done almost everything possible to make its success short-lived.

Producers madly went ahead with inadequate equipment operated by persons to whom the fundamental principles involved were as unfamiliar as Sanskrit is to the average person. Exhibition could not have been more badly handled than it was. It was a long time before projectionists, incredulous that a major industry in dire straits could indulge itself in further economic strangulation, became aware of what their pay-giving bosses *thought* they were doing.

The 3-D Projection Shambles

Even after the projectionists had learned the *how* they were not provided with the proper *means*. Interlock mechanisms were often of the shoddiest design and assembly; port-hole filters were often of the wrong type or of inferior polarizing materials. And they were almost impossible to keep clean.

The exhibitor was provided, in many cases, with polarizing viewers that were nothing but junk. Unsatisfactory screens were more common than good ones; in many cases the theatre owner was told that all he needed to do was to have his old screen sprayed with aluminum paint.

No other American industry has ever done the deplorably stupid things that the great (?) motion picture industry was guilty of when it latched onto (literally) 3-D. No wonder 3-D films came upon evil days.

A Long-Look into 3-D's Future

What does the future hold for 3-D? Nothing but interment unless the industry realizes its great potential and supports the research and development that will assure the perfection and convenience required. Certainly the attempt to apply 3-D to the various wide-screen processes will be a complete failure unless a lot of new development work is undertaken in advance.

Dual projection must go! It was an expedient—and that's all! Its inconvenience and unreliability were recognized by projectionists from the very outset. If 3-D has any chance for revival, acceptance and growth, some single-film system must be used. At present, the Vectograph process invented by Dr. E. H. Land of Polaroid Corp., and Joseph Mahler, and being developed by Polaroid and Technicolor, offers the best solution. For one thing, it affords a better utilization of light than is possible with any other single-film method.

The full possibilities of 3-D have not been explored. Among all the developments of the 3-D art, there is one which has some of the greatest potentials, and that is binaural sound. Binaural sound will give each ear its own sound signals just as stereoscopic photography gives each eye its own picture signals.

Binaural sound is quite different from stereophonic sound. It provides, the writer thinks, the ultimate in sound reproduction, as far as giving a sense of location of the sound source is concerned.

It doesn't merely "tell" whether the sound source is at the left or right or in any other direction: it pinpoints the sound in space, and in its exact direction, tells not broadly that it's from left or right, but tells exactly where it is to the left or right and how far away it is.

Binaural sound is *true 3-D sound*. It doesn't seem to emanate directly from the lips of an actor, from the oboe playing the obligato, from the place where water drips from an overflowing gutter, from a mischievous boy barely seen behind the shrubbery. It is as different from stereophonic sound as a big picture is different from a small picture.

Binaural Sound, Plus 3-D

Stereophonic sound is exciting, is effective, particularly for wide-screen presentations of conventional films. It is doubtful whether binaural sound would contribute much to a 2-D wide-screen movie, but it certainly would add the *ne plus ultra* to the 3-D wide-screen presentation. And 3-D wide screen movies can be produced and presented. There are no technical problems unique to 3-D that do not exist for 2-D wide-screen.

We may look forward to wide-screen 3-D as an early embellishment of the art, and to the eventual wedding of binaural sound with wide 3-D—a wedding the consummation of which would undoubtedly result in a robust box-office.

The "stereoscopic window" is often touted as a prime necessity for standard 3-D presentations. The stereoscopic window is something that has been contrived to achieve coincidental image reconstitution and to avoid marginal disturbances. We don't have to have this window if certain 3-D photographic and projection procedures are employed.

It is perfectly possible to have 3-D pictures existing in space the margins of which are vignetted, gradually shaded off from outer darkness to the full illumination of the picture itself. Some optical problems exist in the methods of doing this, but they are not very difficult to solve.

★ ★ ★

Philosophic Background of Labor Unions

By SUMNER H. SCHLICHTER, Ph.D.

TO THE man in the street, the principal function of unions is to raise wages and reduce the working day. But this conception misses the main significance of labor organizations. Primarily they are significant because of their relationship to the government of industry. In the early Middle Ages, sovereignty and property were

separated — the ownership of land carried with it many powers that have since become functions of the state. The gigantic units of modern industry appear to be bringing about a revision to the days when the sovereignty was an attribute of property.

Pre-Operating Procedure

With the ownership of property went the power to prescribe rules which affected employees as intimately as did the ordinances of the city in which they lived, rules which prescribed when work should begin, how long the men should have for lunch, when work should cease, for what reasons and how long employees might absent themselves without losing their jobs, whether payment should be by the day or by the piece, by whom and for what reason a man might be discharged, how promotions and lay-offs should be made.

Modern business enterprises, unlike feudal lords, do not have their own courts, but the control over discharge gave them a rough equivalent.

Decisions Based Upon Rules

Wage-earners have sought, through the organization of trade unions, to resist the tendency of property to acquire sovereign or quasi-sovereign powers. Wherever trade unions have sprung up, they have sought to make shop rules a matter of joint determination and their administration a matter of joint control. In other words, in the place of despotism under which the word of the manager is final, unionism seeks to introduce the principle that decisions should be based upon rules and that rules should be based upon the consent of the governed.

Management-Employee Cooperation Fruitful

Quite a large number of labor unions — notably the machinists, the electricians, the sheet metal workers, the boilermakers, the blacksmiths, the carmen, the printing pressmen, the photo-engravers, and the clothing workers — have demonstrated not only their willingness to cooperate with managements in solving proplems of operation but their ability to make an important contribution.

Needless to say, these organizations are not willing to cooperate on *any* terms or conditions. Naturally and properly, they put the interests of their members ahead of the interests of the stockholders for whom they work. The fact remains, however, that ingenious and far-sighted leaders on both sides who possess the will to cooperate have succeeded in discovering a basis on which management and labor can join to promote the interests which they have in common.

Union-Management Cooperation?

Whether or not the dominant role in American industrial relations during the next generation will be union-management cooperation or bitter class-struggle depends upon the leaders on both sides. My prediction is that the policy of union-management cooperation will prevail, because I am confident that there is enough industrial statesmanship among American business men for them to realize that the policy of suppreseing organization is the policy of sitting upon a safety valve.

★ ★ ★

EASTMAN

Synonym for Photography

George Eastman

OF all the fields open to young men in the 1870's, photography was one of the most challenging. George Eastman, founder of Eastman Kodak Co., discovered this when he purchased a photographic outfit in 1877 and set about penetrating the mysteries of picture-making. If they were not actually held in disrepute, practitioners of the art were viewed with humorous indulgence, and the back-breaking paraphernalia which they were obliged to carry about with them did nothing to relieve their plight.

The 23-year-old George Eastman shouldered his dark-room tent and cumbersome wet-plate apparatus with the rest—but unlike them he was not content to carry the burden for life. His inquiring mind explored the possibilities for improvement, and he found the challenge a heady one. He proceeded to devour all the photographic literature of the day and applied himself in his spare time to experimentation and study.

Eastman's Historic Dry Plate

The result of his painstaking—and sometimes heart-breaking—work was the perfection of the photographic dry plate in 1880 which, in contrast to the wet plates used prior to that time in conjunction with bulky and complicated equipment, made photography a relatively simple process.

Eastman once said: "A lot of failures often lead up to success." He spoke out of his own experience: ruin threatened him more than once. His energy, application and purpose turned those failures into success—but it was his vision that built an industry and brought photography within the reach of almost everyone.

Very early in his career that vision led him to devise a plan of action for the conduct of his business from which he never deviated. The wisdom of his program became more and more apparent in the ensuing years: Kodak's part in the advancement of science and the betterment of humanity through photography may be directly traced to the principles he laid down. They were followed during his life and continued after his death up to the present day:

Eastman Kodak Co. Basic Principles

1. Mass production at low cost
2. Intensive photographic research
3. Development of new products
4. World distribution
5. Growth of company facilities and services
6. Extensive advertising
7. Employee benefits

The history of Eastman Kodak Co. is the iteration

and reiteration of these fundamental founder principles.

"Milestones in photography," whether in still-picture or motion-picture form, would be a wholly ineffectual title for the listing chronologically of the contributions made to the art by Eastman Kodak Co. for the simple reason that the name "Eastman" is automatically translated in the minds of millions of people the world over as a synonym for photography.

Some Noteworthy Recent Developments

Of particular interest herein, however, is the appended list of a few achievements of the Eastman group in the 35-mm professional film during the past 15 years:

Fine Grain Sound Recording Films Type 1372 (variable area) and 5373 (variable density) which improved motion picture sound quality. These films are now Types 5372 and 5373, the first digit 5 indicating safety base.

Color Negative Film Type 5247 (daylight balance) and Color Print Film Type 5381. These two films were supplanted by Color Negative Film Type 5248 (tungsten balance) and Color Print Type 5382. Companion products are Panchromatic Separation Film Type 5216 for the production of separation positives, and Color Internegative Film Type 5245 for the making of duplicate color negatives.

These films have found wide acceptance in the entertainment motion picture industry for the production of high quality 35-mm color release prints for theater use.

Tri X Panchromatic Negative Type 5233. This product has just recently been introduced and is destined to find wide usage wherever a very high-speed negative with relatively fine grain is required. It is especially adaptable to various types of news work where pictures must be taken under conditions of low illumination.

Introduction of Acetate Safety Base

Perhaps the most important development of all was the complete discontinuance of nitrate base film and supplanting it with triacetate safety base film. This base is now superior to the former nitrate base in all characteristics and has the obvious added advantage that it eliminates for all intents and purposes the fire hazards that existed before with nitrate base film.

A great amount of experimental work has been done by Eastman Kodak toward improving the projection life of film and the problems brought about by the need for putting more light on theater screens.

Eastman Kodak Co. developed a drying method for motion picture film for use in laboratories which enables film to be dried in only a fraction of the time required heretofore. This system utilizes high-temperature air which impinges directly on the film.

★ ★ ★

New Techniques, Equipment Dominate Movie World

By WALTER GREEN
President, National Theatre Supply Co.

VIEWING the technological changes which have taken place in the motion picture field during the past two years, one just must respect the resiliency and recuperative power of the exhibition end of the industry. "Bounce" might be a more apt descriptive term for this go-and-get-it-done spirit which is the mark of the many thousands of showmen—seen and unseen by the paying patron—throughout the world, but it would be "bounce" compounded of many diverse qualities.

Witness, for example, the developments in the industry during the past two years. Decisions as to the nature, the content and, above all, the format of the motion picture were made practically overnight in the production centers. Assuredly, consideration of the manner of exhibiting these new, and sometimes radically different, techniques was extended; but the *practical application* of these techniques, the translation from a thought process to an economic reality *via* the box-office is the concern of the equipment manufacturer, the supply and service organizations, and last but by no means least the *effective delivery* of the finished product by the theatre's technical personnel—in most cases, the projectionists.

Panoramic View of Industry Needed

The supply dealer (and particularly the supplier who operates on a national scale and still has to consider the purely local character of any given operation) is unique. He it is who has to be hydra-headed with a vision broad enough to encompass the current trends in production, the availability of suitable equipment in sufficient quantity to satisfy the demand, the means for the quick transit and efficient installation of that equipment, and the final and vital requisite that, once installed, the equipment measure up to its pre-performance rating. Nowhere along this tenuous line is all-out cooperation more vital than at the link between the supplier and the user.

Strenuous as have been the past two years for all branches of the motion picture industry—and particularly for those of us who are directly involved in the delivery to the public of the finished product—it is obvious that the changes wrought in both production and exhibition have infused new and richer economic blood into the industry.

Opposing Views Stimulate Thinking

Honest differences of opinion as to the various new processes of production and exhibition there certainly have been, but these divergent views have in themselves been a blessing because they stimulated serious thought as to the *means* employed to best exhibit the industry's wares. Producers, distributors, suppliers, exhibitors and projectionists were somehow channeled into a single stream of thought by reason of the intense common concern about techniques and equipment.

The industry generally, and particularly the exhibition branch, has been intensely concerned with, and sometimes apprehensive of, "new" processes. Yet the "new" approach in itself is a mark of industry vitality which will serve all of us well in the struggle out of the swamp of stagnation.

It is evident that the new processes employed by the

motion picture industry have at least held in check the pressures exerted by other forms of entertainment, including television. In terms of form, content, color and sweep of action provided, the motion picture theatre today need not give ground to any other entertainment medium. Of course, it would be a boon to our industry if the thousands of free and therefore untaxed Tv broadcast tickets were eliminated.

Over-All Cooperative Effort Will Prevail

Daring and imaginative in providing the new and novel our industry has been during the past two years. Given the proper application on both the production and exhibition fronts of those new techniques which sprung from our own resourcefullness and ingenuity, our sector of the entertainment world should and can continue to flourish.

★ ★ ★

The SMPTE Salutes *the IATSE*

By HERBERT BARNETT
President, SMPTE

THE past two years mark perhaps the second greatest evolution the motion picture art has known. Feverish development and exploitation activities have brought unusual problems to every segment of the industry. Engineers have been required to compress into weeks and months programs which would normally require years.

Creative people have faced the necessity of adapting new techniques and expressing these in a manner to take full advantage of the available potentials. Equipment manufacturers, theatre owners and managements everywhere have been called upon for decisions of gravity seldom encountered in this industry.

In these matters, it is recognized by all that a great portion of the burden of successful exploitation depended heavily upon the various segments of the I.A.T.S.E. Its membership was required to adapt promptly to new techniques, equipments and conditions. The degree to which they succeeded in this obligation meant the difference in success or failure of any new process.

Sixty Years of Craft Advancement

This, of course, is no new role for the I.A.T.S.E., as its membership has quietly accepted various evolutions in the art for more than 60 years. Their part in making and exhibiting motion pictures is so consistently well performed that it is too often viewed as routine. This only emphasizes the degree to which they have mastered the techniques involved and the constant determination to keep abreast of change and progress.

We of the SMPTE feel especially close to the I.A.T.S.E., for we as a team are the technicians upon whom good product depends and we in turn are quite dependent upon each other. The Society numbers among its membership many I.A.T.S.E. members, and we consider these to be a vital part of the organization.

The SMPTE salutes each of you as valued assets in the motion picture art and for your continued devotion to the unheralded job of producing and selling high-quality entertainment to American audiences.

★ ★ ★

Seamless Screen Specialists

THE ACQUISITION by the Bodde Screen Co. of additional matrixes now enables it to supply custom-made seamless projection screens on a quantity production basis without sacrificing quality or longevity of the finished product. Heretofore it has been impossible to fill other than special orders, mostly from the major studios, preview theatres, experimental installations and the like.

The Bodde seamless screen is cast in one piece—not a seam in any size ranging up to 35 x 90 feet. These screens are free from streaks, "clouds" and perforation blemishes. The basic material for these screens is now double-weight in thickness for greater strength, and it has been approved by the U. S. Army Air Force for fungus resistancy. Importantly, these screens are washable with any soluble soap solution, or they may be cleaned by simply flushing them with clear water.

High Sound-Transmission Quality

Anent the sound-transmission quality of the Bodde seamless screen, the Motion Picture Research Council reports only a one-half db loss overall. This low figure is due mainly to the fact that this screen is manufactured from ethyl cellulose instead of the usual spongy vinyl-type material. The screen is certified as flame-resistant (self-extinguishing) by the State of California.

The only cloth in the Bodde screen is the molded binding on the edges. The highly reflective aluminum surface retains its stability because the aluminum is incorporated in the basic sheet itself.

Reflecting Factor Data Essential

Bodde screens are obtainable in three reflecting factors: Type A (for a narrow theatre) has a 4:1 gain factor; Type B (for a medium width theatre) has a 3:1 gain factor; Type C (for a wide theatre and/or a steep balcony) the gain factor is 2½:1. The screens are shipped in kiln-dried wooden boxes on 3-inch seamless alumnium poles, with cotton-soft liners between screen surfaces for protection in shipping and storage.

"Gain factor" is a mighty important factor in the selection of a projection screen surface, thus it is imperative that such data be given the supplier. Complete data on a screen surface for any and all uses will be forthcoming promptly upon request to Bodde Screen Co., 8829 Venice Blvd., Los Angeles 34, Calif.

No matter what the screen problem, Bodde will service without charge and inquiry thereon.

★ ★ ★

VIEW OF PARIS by Friedrich von Martens in 1846 shot with a panoramic daguerreotype camera of his own invention. Wide angle? Yes, indeed.

The Lure of Wide Pictures

The "enveloping" of the spectator is an obsessice cliche employed by those who advocate wide-wide visual images. For panoramic viewing, whether direct by the viewer or on film—maybe; but for *dramatic content* requiring viewing concenration by the viewer—it would seem to be no! esthetically and physiologically.

THE WIDER THE PICTURE and the wider the screen, the more the spectator feels enveloped. He cannot see all the picture at a glance, and the scanning which he is forced to do heightens the illusion of reality. This type of picture found expression early in photography. Friedrich von Martens, a German engraver in Paris, designed a special camera for daguerreotype plates in 1844 that would make pictures about 5 inches high and 17½ inches long. He made the view of Paris reproduced here in 1846 with this strange camera that held the long plate in a curved position while the lens swung during exposure.

Rotation of the Entire Camera

This principle of using a curved sensitive surface with a swinging lens was followed by other camera makers, notably Moessard in his Cylindrographe camera in 1854, and Eastman Kodak Co. in its Panoram Kodak camera of 1899.

The daguerreotype plate, made of silver-plated copper, could readily be bent; but when rigid glass plates superseded it after 1851, some cther means had to be found. M. M. Johnson & Harrison, of London, solved the problem by using a long glass plate, a stationary lens, and a mechanism to rotate the *entire* camera: the same clockwork that turned the camera also moved the plate past a slit at a rate of speed which would allow the image to be registered continuously without a blur.

Spool-to-Spool Wind

This was an awkward camera, and as soon as film became available a more compact one was devised which wound the film from spool to spool in time with the movement of the camera. This type of camera, typified by the Folmer and Schwing Cirkut camera of 1908, became extremely popular. Thousands of companies of soldiers, high-school classes, and mountain ranges have stood in front of this ingenious device.

It is a little confusing that most writers lump these two very distinct kinds of cameras under the term "panoramic", without qualification. In the past century various advertisements have frequently praised the greater sense of "reality" that the wide pictures offer. The feeling probably comes from the reconstruction of the spectator's normal relation to the visual world.

Wide-Angle Vision—in ONE Plane

Man has a wide-angle vision, and as he turns his head it becomes wider; if he spins on his heel, his angle of effective vision increases to 360 degrees. Consequently, to get the maximum sense of envelopment the spectator should stand in the center of a circular room with a picture stretching from *floor to ceiling* surrounding him. Thousands were entertained with such a device at the Paris Exposition of 1900.

Photographic and Projection "Bend"

A number of distortions arise in wide-field photography, some of wnich can easily be demonstrated and remedied. In the view of Paris, for instance, the river seems to bend towards the spectator when it is viewed as a flat picture. But if the picture be curved into the same position the original daguerreotype had as it rested in the camera, the river is returned to its bed.

Try it!

[NOTE: *But*—it's still distortion —ED.]

★ ★ ★

Perspecta Sound System

(Continued from page 33)

outside channels, thus desensitizing them by approximately 25 db.

Simultaneously a fixed bias can be adjusted at the unit to insure a correct level balance between Perspecta stereo sound operation and monaural or normal film track operation. The value of bias will be applied to the center controlled amplifier section. This insures the compatability of the Perspecta stereo sound Integrator Unit, so it automatically, presents either standard optical track or Perspecta stereo sound scored optical track, correctly in each case, and the projectionist need not be concerned as to the type of optical track running through the soundhead.

If, in a rare instance, a track is played for non-Perspecta stereo sound reproduction that contains an abnormal amount of low-frequency energy for extended periods of time that may cause the auto-switching circuit to operate, there is provided, on the front panel of the unit, a switch which will manually *deactivate* the auto-switching system so as to insure no interruption of normal performance during this abnormal situation.

There is an indicator light on the front panel of the Integrator unit that indicates when the auto-switching circuit has changed to Perspecta stereo sound operation.

The installation of the Integrator in the theatre is a relatively simple procedure. The output of the changeover switch is connected to the input of the Integrator, which is equipped to provide adjustment to accommodate the variances in level at this point in different types of systems, *i.e.*, the RCA low-level system or the Westrex high-level, pre-amplifier system.

The output of the Integrator is connected through a ganged fader system to the input of the three amplifier channels. After installation, the projectors are adjusted so that they have an equal output and equal frequency response. After this adjustment, the Perspecta stereo sound calibration reel is run through each of the projectors and the Integrator unit is calibrated.

No 'Deviling' the Projectionist

From here on, with the switch set for automatic operation, the projectionist need not be concerned as to whether he is playing a picture scored with Perspecta stereo sound or a regular soundtrack. As noted previously, if there is Perspecta stereo sound scoring on the soundtrack for 7 seconds, the unit will automatically switch into Perspecta stereo sound 3-channel operation and remain in this position for the duration of that sound track. When there is no low-frequency control present, the unit will not be activated and the sound will be channeled through the center horn system.

The 30-cycle filter controls the volume level of the left horn system as seen facing the stage. The 35-cycle filter is for the center horn system. The 40-cycle filter is the control for the right-hand horn system.

In scoring a picture for Perspecta stereo sound, a composite soundtrack is most generally used for making the final recording. The track is run synchronously with the picture and monitored through an Integrator Unit so

A TIP OF THE HAT

TO EVERY PROJECTIONIST

FROM . . . NATIONAL THEATRE SUPPLY

Division of National • Simplex • Bludworth, Inc

that all changes in carrier amplitude, with their resultant directional changes, can be observed by the mixer simultaneously with the combination of the control signal and audio tracks for the final release track. After the optical track is made, incorporating the control signal information, it is interlocked with the picture again to check mix and direction. When approved, a final release composite print is made.

This technique follows lines well established within the industry. The Integrator unit with its corresponding power amplifier and horn channels, is the only addition necessary in the theatre.

A general plan for installation has been hit upon that fulfills completely the requirements of the average theatre based upon experience with the Loew's theatre installations. These houses were equipped with penthouse reproducers and stereophonic channels with magnetic reproduction; also, they were equipped for standard optical reproduction through a separate set of amplifiers with the addition of an Integrator unit which would reproduce through their stereophonic power amplifier system from the standard optical head system.

Altec Service Corp. devised a very novel switching arrangement that minimizes confusion for the projectionist. This switching system is mounted in the close proximity of the Integrator unit and has three positions:

THE FIRST POSITION is labelled "Standard Optical": when in this position the output of the soundhead is fed through the normal optical channel that has always been in the theatre to the center horn and is used more or less as an emergency system.

THE SECOND POSITION is labelled "Magnetic": this connects the output of the penthouse reproducers to the equivalent stereophonic power amplifier channels through the ganged fader.

Switching to Perspecta Sound

THE THIRD POSITION is labelled "Perspecta Sound": this position connects the output of the optical soundhead to the input of the Integrator and the output of the Integrator through the ganged fader system to the stereophonic power amplifier system.

With the switch set on "Perspecta Sound," the projectionist need not be concerned as to his newsreel and short-subject program reproduction because, as outlined previously, the Integrator will switch from stereophonic reproduction to center horn reproduction *automatically* based on whether the program is scored for Perspecta stereo sound or standard film.

In the field tests that now have been running for 5½ months *throughout the world*, there has been very little or no difficulty encountered in most installations and runnings. In theatres having no regular service organization, the projectionist need only run the Calibration Reel once a week or so just to check the over-all operation of his soundheads from a sensitivity standpoint, and to get indication as to exciter lamp brightness and balance between projectors. Under general operation there is no need for any particular service to the Integrator unit itself. It is a stable, well-engineered device, and should prove trouble-free for extended periods of time.

★ ★ ★

Greetings and Best Wishes

to all the delegates

IATSE and MPMOU Convention

CLAYTON PRODUCTS CO.

JOE CLAYTON

Member, Local 306, New York City

Compliments to . . .

I.A.T.S.E.

BODDE SCREEN COMPANY

8829 VENICE BLVD., LOS ANGELES 34, CALIFORNIA

Manufacturers of Cast "Truly Seamless"

Quality Theatre Screens

Evolution of Simplex Projector

(Continued from page 31)

from the Powers in that it was a considerably more compact mechanism completely enclosed, being on a pedestal of entirely new design and having a great many features which appealed tremendously to the projectionist. Precision also built up an excellent patent structure covering, among many others, the following salient features:

1. The basic patent covering the entire equipment and including the new framing device by means of which this operation was accomplished by rotating the intermittent casing about the intermittent sprocket axis.
2. A new method of focusing lenses on projectors.
3. An entirely new gate and film-holding structure to maintain the film in the correct optical plane above the intermittent sprocket.
4. Complete enclosures for the mechanism, all prior mechanisms being of the open type with gears exposed.
5. The method of framing the picture in the Simplex mechanism.
6. An improved film-gate door lock, enabling the projectionist to easily close and latch the film-enclosing gate.
7. An entirely new design of fire valve for film magazines.
8. An entirely new type of mechanically-controlled variable-speed device for use with constant-speed motors on projectors.

The corporate existence of International Projector Corp. dates from 1925 as a result of the merging of Precision Machine Co., Nicholas Power Co., and the Acme Motion Picture Projector Co., with all manufacturing facilities and personnel being concentrated at 90 Gold Street, New York City.

This consolidation ushered in a new era of development in projector manufacture, one of the early fruits of which was the Super Simplex mechanism. This projector, while resembling to some extent the older regular Simplex mechanish, embodied many improvements making for better visual projection, greater ease of operation, and considerably more efficient handling of the lens system. A great improvement was made in the intermittent movement by the development at the plant of machinery for manufacuring the operating parts of the movement, that is, the star wheel and cam, and for obtaining far greater accuracies than were obtainable previously.

Another major Super Simplex development was the removal of the revolving cut-off shutter to the rear of the projector so that it interposed between the illuminant and the aperture plate. Other Super Simplex improve-

INTERNATIONAL PROJECTIONIST

A Technical and Craft Journal

WALKING THE PATH OF PROGRESS TOGETHER!

In company with his skilled fellow craftsmen of IATSE, the ALTEC SERVICE engineer travels the path of progress toward the common goal of technical perfection in the field of entertainment.

ALTEC SERVICE CORPORATION

161 Sixth Avenue, New York 13, N. Y.

SPECIALISTS IN MOTION PICTURE SOUND

ments involved a new type pad roller arm for accurately maintaining the film on the sprockets, a threading lamp for quick and accurate framing before projection, and an assembly of enclosures for the entire mechanism.

Sound Eliminated Powers Projector

Now occurred one of those entirely unforseen and wholly unpredictable situations which resulted in the virtual elimination of the Powers projector from the theatre field. Sound reproducing equipments made by W. E., and later by RCA, were in the beginning made for adaptation to the Simplex projector only, this being because several of the large-circuit early buyers of sound equipment were largely equipped with Simplex mechanisms. So heavy was the first wave of sound equipment orders that neither W. E. nor RCA paid any attention to the development of a unit for the Powers projector.

This circumstance, although a mortal blow to the Powers mechanism, was in some ways a blessing to the industry because it resulted in the replacement of a tremendous number of Powers units by new Simplex equipment which was destined to render yeoman service to a harassed industry in the dark depression days that were to follow.

This story would be meaningless indeed if it failed to include other outstanding developments by International Projector Corp.: the Simplex Sound System, the Simplex E-7 projector, and the current X-L mechanism.

It may be said in passing, however, that the Simplex Sound System was particularly a child of fortune in that it was designed and manufactured at a time when the sound reproduction art had long since emerged from its cocoon and was already the beneficiary of many notable advances which made for superior performance by vastly improved circuits, better tubes and speakers, greatly enhanced recording, and other factors which enabled a compact reproducing system that shamed the early models of sound equipment.

Advances Scored by International Projector Corp.

A detailed description of the many technological advances scored by International Projector Corp. since its inception would require many times over the space available herein. Milestones in its forward progress, however, are easily recognizable to those veteran practitioners of the projection process, such as:

The Regular Simplex mechanism which first appeared as a single-bearing unit and then gave way to the double-bearing alignment.

The Super Simplex into the manufacture of which was introduced to the trade the practice of hardened-and-ground sprockets. This unit also featured the rear-shutter mechanism.

The Simplex E17 which included a double shutter and a one-shot oiling system which embraced all moving elements except the intermittent movement.

The Simplex E-7 which included a double shutter and and radical advances as to constitute probably the most important milestone in projector manufacture.

On the sound reproduction front, Simplex brought out in 1938 the famous Simplex 4-Star sound system which was the first to utilize permanent magnet speakers. This was followed in 1950 by the radically new design of X-L loudspeakers for use in both enclosed and open-air theatres.

In 1954 Simplex scored another notable advance when it made available to the sorely-pressed motion picture industry a 4-track magnetic sound reproducer system.

Thus was staked out the long, long road leading from 1896 onward and ever upward to the magnificant motion picture theatres of today which, by comparison with the early nickelodeons, are truly palaces worthy to house a living, vibrant art that daily endows so many with so much for so little. Verily, a promise has been redeemed.

ROSCO FILM CEMENT

Time Tested

for

Thirty-Five Years

The uniformity is consistently maintained

PERFECT FOR CINEMASCOPE

Distributed By Dealers Everywhere

ROSCO LABORATORIES

367 Hudson Street • Brooklyn 1, N. Y.

ONE Projection Lens For ALL Aspect Ratios

PACIFIC OPTICAL CORPORATION

5965 West 98th Street

Los Angeles 45, California

B-4800

New Xpansa lens gives continuous focal length variation. Added to your regular projection lens, it lets you show all standard (non-anamorphic) release prints regardless of aspect ratio. It also provides rapid and perfect matching for 3D projection. This eliminates the need for several lenses and gives you wider program variety. The Xpansa lens gives picture quality equal to your present system, is easily installed, and requires no booth modification. See your local theatre equipment distributor or write for *free* literature. Distributor inquiries invited.

"Unwept and Unsung"

(Continued from page 28)

technological accomplishments which make the box-office possible.

Producers, directors, and stars are well-known and widely publicized. And they should be. But it might also be an excellent device, if only from a promotional viewpoint, to stress the enormous contributions to the enjoyment of the audiences made by the technicians. There is a lot which could be said in such fashion as to interest, attract and please the audience. Perhaps fewer people would then take skilled studio and theater operation for granted. Maybe if the average theatergoer knew more of what goes on behind the technical scenes, he might better appreciate how much is offered him daily in the theatres of the land.

Other Industries Much More Perceptive

Other industries have done a somewhat better job along these lines relative to their skilled employees. Consider, for example, the airplane pilot. His skill and human value have been emphasized in the aviation industry. And even the motion picture itself has gone to great lengths to portray him favorably: the pilot appears as the star of many a story, play, or film of war in the skies or bravery and quick response to emergencies in peacetime. Thus the pilot has become a romantic and admired figure with the public. But who ever heard of the quick response to emergencies, the wise handling of unusual situations, and other desirable traits of the I. A. worker?

Many of these men working under difficult, monotonous, and occasionally highly demanding conditions could well be made the subject of an interesting and thrilling account. Today they remain "unwept, unhonored, and unsung". We still have to see the names of any competent, conscientious, and really unusual members of the I. A. appear in the bright lights over the marquee or on the flaunting posters in the lobby. Indeed, so far as the public and the press are concerned, these men, so essential to the entertainment world, are practically unknown.

Yet it is certain that authors with a gift for ferreting out the unusual and newsworthy parts of the life of the I. A. worker, and with the talent for describing them, could create great stories of the theater and its life built around these workers. One of the great operas was developed around a much lesser and vastly different figure — namely, a wandering clown. So it is curious that the showmen of the industry have failed to see the valuable theatrical material which exists right at their very doorsteps.

It is likely as well that, if the public were more impressed, through widespread publicity, with the skill and application which goes into making and showing a drama or comedy, they might like it all the more. The masterly technique of a great violinist or pianist is much advertised, and this certainly has a great effect upon music lovers.

All that has been said here should be regarded only as a calm comment but not as a bitter complaint. Anyone who knows I. A. men realizes that they do their jobs well and will continue to do so, with or without publicity. But we are all human — a pat on the back has never done anyone harm nor has it discouraged him.

Joint Industry-Craft Action Urged

The purpose of these observations is rather to urge the industrial leaders in the entertainment field not to forget those who bring beauty of form and color into the plays, who provide light and sound to the studios and to the theater audiences, and who in a thousand other ways contribute so greatly to modern entertainment. The public would be amazed, pleased, and gratified if it knew what these men were doing. The industry would thus gain further public respect and improved public relations. And firmer and friendlier coordination of industrial and labor efforts would result.

America — land of freedom, of opportunity, and of fine ideals — grows in power as each worker's stature is strengthened and as each man's talents, efforts, and accomplishments are recognized. The I. A. has done much and can do more to realize the American ideals through the crafts it represents. To it and to its sister unions will go the warm support and approval of all constructive, thoughtful, and equitable efforts they may make for the betterment of the very bone and sinews of their industry — the workers.

★ ★ ★

CONGRATULATIONS IATSE
on your
42nd Bi-Ennial Convention
Our Equipment Has Served Your Crafts For Years—The Items Below Should Be Standard In Every Projection Room

ATOMIC JET LAMPHOUSE BLOWERS
Keeps your lamphose cool . . . Keeps your lamps—stacks—reflectors clean . . . Cuts carbon consumption

PORTHOLE BLOWERS
Protect your coated lenses and expensive equipment from dust—rain—bugs and other foreign matter.

Manufacturers of Complete Drive-In Equipment
Drive-In Theatre Mfg. Co.
Division of DIT-MCO, INCORPORATED
505 West 9 Street, Kansas City, Mo.

IATSE 42nd CONVENTION
Greetings and many thanks to the projectionists and stagehands who have contributed so much to the widespread use of Heyer-Shultz Metal Reflectors.

HEYER - SHULTZ, INC.
Cedar Grove New Jersey

Metal Reflectors – Quality Light

(Continued from page 24)

this refinishing process returns the reflective surface to its original flawless lustre.

To obtain maximum screen light, plus efficient performance, from your metal reflector, you will need to check the optical alignment of your lamphouse and projector head.

The most accurate method of optical alignment is by pinhole aperture. You can make your own pinhole aperture plate, as follows: a flat piece of sheet metal, brass or copper the approximate size and thickness of your regular aperture plates will suffice. Use any one of your present aperture plates for locating the pinhole dead center on the optical axis.

Hold this plate on your sheet of metal, and using an ice pick as a scriber, scratch an outline of the aperture plate and the aperture opening onto your sheet of metal. Then, using a straight-edge or ruler, scribe criss-cross lines within the aperture opening outline from corners to corners. Where these scribe lines cross is center of the aperture opening pinhole and it is here that you should punch, or drill if necessary, the smallest possible hole. If your sheet of metal is thin enough, you will be able to punch this pinhole with the ice pick.

Pre-Operating Procedure

After obtaining a properly located pinhole all that is necessary is to cut around the scribed outline of the aperture plate so it may be inserted into the aperture plate slot in the projector head.

With the metal reflector securely mounted in the reflector holder, and with a new carbon trim set up in the regular position, light up your lamp, start projector, throw the light on the screen and make a preliminary adjustment by reflector movement forward or backward, as well as up, down and sideward. Sometimes it is necessary to adjust the arc also, in order to obtain proper screen light.

If this is required, reset or remark the arc indicator card at once. Because of metal expansion from heat, all optical alignment adjustments, whether visual or by the H-S pinhole method, should be made when the reflector is hot.

CAUTION: do not clean your metal reflector until it has been heat-treated by at least 4 hours of running time in the arclamp, and then clean according to instructions in booklet supplied with every installation. This heat-treatment is necessary because it hardens the plated surface and thus makes it more resistant to scratching during the cleaning process.

★ ★ ★

The Future of Theatre TV

(Continued from page 20)

cooperation has been most valuable in its development.

I believe that the Tele-Sessions idea has a great future because of its tremendous economy compared with the cost of bringing personnel long distances to attend sales and similar meetings. Facilities can be provided for as little as $2 per important viewer attending a company session. The cost of the program varies according to how elaborate the production is ranging from a few thousand dollars upward.

Tele-Sessions shows can originate anywhere—remote from the field, or from the studio, or the theatre, or even from the White House. Every type of meeting place has been served—hotels, theatres, Tv stations and sponsor-company office. Permanent Tv projection installations and mobile projectors especially installed at the meeting place have been used. In the telecast of the New York Dress Institute fashion show, we utilized closed-circuit *large-screen color* Tv.

100-Odd Theatres in 54 Cities

As the score now stands, we have more than 100 theatres hooked up in some 50-odd cities. There are at present 250 cities where Tv broadcast stations exist, and in nearly 200 of these cities there are Bell Telephone facilities, either coaxial cable or microwave relay towers, that can be used to transmit special closed-circuit Tv shows as well as regular network programs. In many of these cities there are theatres that stand to profit by installing theatre Tv equipment.

The general public is the best customer for closed-circuit Tv at the movie box-office.

This year TNT signed a three-year contract with the Metropolitan Opera Co. to present its opening-night program over a nation-wide closed-circuit network. In the past we have presented such outstanding boxing matches as Marciani *vs.* Charles, Robinson *vs.* Turpin and many of the games of outstanding college football teams, such as Notre Dame, Princeton, Columbia, Yale and others. It is my firm belief that theatre Tv can bring new box-

Greetings

to the I A T S E

Fine craftsmanship deserves fine equipment. Today the motion picture industry is blessed with both.

CENTURY PROJECTOR CORP.

729 Seventh Avenue • New York, N. Y.

Manufacturers of fine visual and sound equipment for ALL methods of reproduction.

office life to the motion picture theatre, which in turn means additional employment for motion picture and stage craftsmen.

Reception of these Tv programs in the theatre is accomplished by either the RCA direct-pickup, direct-projection system or by the instantaneous film recording, developing and projection process. Both these procedures have been described in detail in IP.

★ ★ ★

Keeping in Step with Progress

(Continued from page 12)

parts should not be dismissed lightly because these are the first essentials of any emergency protective system!

Another feature of RCA Service consists of a plan of providing for the furnishing of required parts and tubes at a flat low-cost yearly charge. This maintenance plan has been extremely popular with projectionists and exhibitors for many years, and has grown steadily each year. With this plan in force, quality performance is further insured by safeguarding equipment parts from reaching the point of excessive wear and consequent lowering of sound quality. Exhibitors are protected against major expenditure in the way of part or unit replacements.

Long-Range Planning for Future

Exhibitors are aware that whatever method of sound and projection they choose for their theatre, now or in the future, an RCA service expert will render the same skilled service and attention. The reason for this stems from a few basic concepts on which the service organization operates, such as keeping pace with the latest developments in motion picture presentation; keeping field personnel constantly informed of the many new-born techniques and methods of theatre servicing, and making certain the field engineer is continually aware of the importance of changing developments affecting exhibitors and their theatres.

For the past 25 years, RCA Service Company has kept pace with and contributed to the latest developments in motion picture presentation. At RCA, theatre service is an exact science, dependent upon thoroughly trained field engineers with years of practical experience and equipped with the most modern test equipment available. Through its engineering and research groups, RCA Service Company has greatly aided in the progress of the industry and the benefit of the exhibitor.

RCA Service Company has joined with other divisions of Radio Corporation of America, including the David Sarnoff Research Laboratories at Princeton, N. J., in a coordinated campaign to place its theatre service facilities in a position to better serve its exhibitor-customers all over the country. As rapidly as new ideas on sound and projection are introduced, field personnel have this information in their hands, ready to apply them as the situation demands. RCA Service people have kept in close touch with all developments in the theatre industry. They will continue to pass along their ideas and knowledge so that the exhibitors and projectionists will receive full benefit from them.

★ ★ ★

The Carbon Arc: Vital Factor In Production and Projection

(Continued from page 17)

of their ultimate desirability but rather because they are in the range being obtained by some outdoor theatres. The rotating-type reflector lamps and the rotating-type condenser lamps can illuminate screens of 45 to 70 feet with to a screen brightness of 4 to 6 foot-lamberts.

Wide-Screen Ratios, Screen Image Areas

Although the data contained herein are limited to projection from a *standard* 35-mm motion picture film aperture of 0.600 inches X 0.825 inches and thus are not directly applicable to other film aperture sizes and picture aspect ratios, rough estimates can be made in some instances. For example, the outputs of the various 35-mm film projection systems may be redistributed by

Boss:
I'm having best results with
Raytone stuff -- screens,
lenses, frames, paint...
seems like everything we get
from Raytone is just right!!!
That's Raytone Screen Corp.,
165 Clermont Ave. Brooklyn 5, N.Y.
MIDWEST - L. E. COOLEY
408 Oak Park Ave., Oak Park, Ill.

Greetings...

I. A. T. S. E.

AMERICAN CINEMATOGRAPHER
The Magazine of Motion Picture Photography
HOLLYWOOD • CALIFORNIA

optical means over various sizes and shapes of film apertures and projection screens. If this be accomplished with minor or known losses, the results expected can be closely approximated.

The requirements of CinemaScope, which employs a standard projection frame but a 2.55 to 1 picture aspect ratio, can be calculated once the information on the transmission and reflection of the added accessories employed is known.

Except for the optical losses in the added anamorphoscope lens which functions to produce a two-fold expansion of picture *width* during projection, this expansion would produce a *two-fold increase in picture area* and *reduce by one-half* the available screen brightness *obtainable with a normal unexpanded image*. Therefore, the light requirements for the same screen brightness would be almost double those of *conventional* 35-mm pictures on an *unexpanded* screen of the same type—that is, if the CinemaScope ratio of 2.55 to 1 be observed.

The new carbons which have been developed will produce considerably more screen light; their successful utilization, however, will require suitable lamps and other projection equipment.

New Carbons Require Suitable Projection Units

At present, acceptable levels of screen brightness for all projection systems are available, provided the equipment necessary to operate the higher capacity carbons is installed; and provided the entire projection system, including lenses, mirrors, condensers, and port glasses, is in exact adjustment and in good clean optical condition.

It is quite true that "If the picture isn't on the film, you can't put it on the screen." Also true is that if the picture *is* on the film the responsibilities of the projectionist parallel those of the cinematographer. He must balance his auditorium illumination so no bright colored objects will interefere with the picture, and his projection light source must be of the correct intensity and quality.

★ ★ ★

Prescription for Good Projection

(Continued from page 8)

light when it is not required. If you have one of the new high-power lamps, the grid can be slipped into the holder for the heat-reflecting glass. It will be quickly removable. The total area of the holes in the metal, whether round or square, should be about equal to the area of the metal between them.

The only way to be sure your light is correct is to have it measured. The writer was caught this way not so long ago. The crime took place in a small theatre right in the middle of a large field on a summer day. The patient complained bitterly of flicker. All the equipment was the best, and everything was in good condition. It took sometime before someone brought a meter along and found that there were 60 foot-candles on the little screen! Coming straight in from the bright light outside, the picture didn't look too bright at all. It just flickered.

Just How Good Is Your Sound?

Now as to the sound. How is it? Of course there are problems with an unwilling patient. We have all heard of the deaf manager, just as we have heard of the one-eyed theatre owner who "did not believe in 3-D." But even a deaf man can be treated with tact. People with sensitive ears can be driven out of the theatres just as easily as the deaf ones, so don't forget the bedside manner and the bedside attitude. I mean, of course, the constant watch that the volume and quality are just as right as they can be.

Sound equipment these days has improved in basic design, but it is often true that stereophonic additions have been somewhat hastily and thoughtlessly installed,

The new VICTOR
1600
travels ANYWHERE!
GREETINGS CONVENTIONEERS!
We at VICTOR
extend to you our very best wishes for complete success in your convention deliberations. We are proud to serve such a fine group of craftsmen with visual-sound reproducing equipment which has won universal recognition for its fine design, expert workmanship, simplicity of operation, unfailing stability—and above all, economy in purchase price and operating cost.
Good Luck!
It's so easy to transport this 16 mm Sound Projector. The Victor 1600 Arc Projector disassembles into three carrying units. These pack easily in the back seat of your car. Can be assembled and set up in less than five minutes. And built-in floor levelers provide a firm base for set-up on uneven ground.
Write today for big free booklet.
VICTOR
ANIMATOGRAPH CORPORATION
DEPT. Q-7 DAVENPORT, IOWA
Branch Offices in New York and Chicago
Quality Motion Picture Equipment Since 1910

so that it is not nearly so convenient to operate as are the better designs of old equipment. This means increased watchfullness.

Let us take flutter as a first example. Many of the older reproducers, both for film and records, had a high flutter output. This distortion was inherent in the design. Nowadays, it cannot be excused. The SMPTE and the Motion Picture Research Council have agreed on standards, and the better manufacturers produce equipment which performs much better than the standards if the equipment be in good condition.

If it be in good condition! Here again your judgement and experience come into play. Was that a sour note from the magnetic penthouse reproducer? Listen again. Yes it was, and at the same time perhaps you heard the film rub on the reel edge in the upper magazine. That's it! Every time that bent reel rubs the film, the sound goes just a little sour. No specialist needed for that one. Let's get some new reels at last!

Delicate Flywheel Balance

Another cause of such trouble could be anything touching the flywheels (impedance drums) in the reproducer. These flywheels look solid and heavy and as if they could bulldoze their way through trouble, but just try flicking one with a feather and listen to the result. If they were not so solid and heavy and free-running, they would not work at all.

Non-sync turntables are often at fault these days. Nobody needs telling what happens when the record is a "swinger" with the hole not in the center, but similar trouble can be caused when a cheap turntable motor, which is good enough at 78 rpm, is run at 33⅓ rpm for IP records. The flywheel effect is much less at low speeds, and the services of a specialist are often required, probably to replace the turntable.

Now suppose there is trouble with the volume of the sound. Your unaided eyes and ears will often help you find the trouble faster than can any specialist with a meter. Just to save red faces you will see that the power is really on, and that a piece of that worn advertising film didn't get stuck half way across the light beam from the exciter lamp.

Check Loudspeakers Frequently

Now lets go down to the stage. Sound goes just a little bad sometimes for very simple reasons. After any work on the stage, the workers swear that they put the loudspeaker back "just in the same place." But is it pointing down the center of the theatre? No? They put it back in the same place all right, but the high-frequency unit is pointing right up at the ceiling. This is easily put right; but it is often not realized that, with stereophonic sound, the right-hand speaker must be heard at the left side as well as at the right.

The aiming of loudspeaker units here can be really critical. Very careful listening tests are necessary and should have been made during the tryout period to determine the best positions. This should be a job for the "golden ear boys," but if they had to skimp it, your own ears aren't so bad either.

Now, as a good doctor, you'll keep your operating room clean and tidy, and essential tools at hand. You should listen to the stage loudspeakers now and again to make sure nobody has pulled out a plug on one of them. Try to insure that there is enough space to operate comfortably. Over the years, an inconvenient switch or an equipment cabinet you have to walk around twenty times a day, can wear out a lot of patience.

Lastly, as a good doctor you know when some or all of your equipment is dying of old age. You'll never get good sound out of old soundheads or a good picture out of a projector which still has a hand-crank extension on it. Live with it if you must for a time, but don't forget that the paying cusomers appreciate quality.

★ ★ ★

GREETINGS

from

J. R. CLANCY, INC.

Syracuse, N. Y.

World's Largest Designers, Manufacturers and Riggers of Mechanical Stage Equipment

You can always get it at CLANCY'S

IF YOUR HOBBY'S ELECTRONICS ...

These Rider books make electronics simple ... easy ... and fun!

INTRODUCTION TO COLOR TV
Answers all questions on present-day color TV, and explains differences in black and white and color circuits and picture tubes.
144 (5 1/2 x 8 1/2") pages, paper bound, only $2.10

HOW TO SERVICE TAPE RECORDERS
The complete tape recorder story! Makes the reader familiar with every section ... recording heads ... drive mechanisms ... circuits!
Appr. 176 (5 1/2" x 8 1/2") pages, paper bound, only $2.90

HOW TO TROUBLESHOOT A TV RECEIVER
A step-by-step guide to systematic trouble-shooting. Tells how to service your own set quickly, easily, economically!
128 (5 1/2 x 8 1/2") pages, paper bound, only $1.80

HIGH FIDELITY SIMPLIFIED
Life Magazine raved about it ... Radio-TV News said, "Those planning Hi Fi for their homes will save time, trouble, and money by reading this book before they buy."
208 (5 1/2 x 8 1/2") pages, paper bound, only $2.50

ORDER THESE RIDER BOOKS TODAY!

JOHN F. RIDER PUBLISHER, INC., 480 CANAL ST., N. Y. 13, N. Y.

Editorial Index

Greetings from the President of the AF of L 3
GEORGE MEANY

Prescription for Good Projection 7
BASIL T. WEDMORE

White Screen? Yes—Within Certain Limits 8
LEONARD SATZ

Keeping in Step With Progress 11
W. L. JONES

The Carbon Arc: Vital Twin Factor in Production and Projection 14

Flexibility Marks Modern Arclamps 19
ARTHUR J. HATCH

The Future of Theatre Tv 20
NATHAN L. HALPERN

VistaVision: World-Wide Standard 23
LOREN L. RYDER

Metal Reflectors Meet Exacting Requirements 24
E. B. HEYER

Magnetic Sound Reproduction 27
W. BORBERG and A. A. LEONARD

Unwept and Unsung 28
DR. A. N. GOLDSMITH

Evolution of the Simplex Projector 30
EDWARD B. GARRISON

PERSPECTA—The All-Purpose Sound System 32
ROBERT FINE

From "Magic Lantern" to Stereo Sound 34
H. T. MATTHEWS

TESMA and the Projectionist 35
FRED C. MATTHEWS

3-D Movies . . . Epitaph or Prologue? 36
JOHN NORLING

Philosophic Background of Labor Unions 36
SUMNER H. SCHLICHTER

EASTMAN—Synonym for Photography 37

New Techniques, Equipment Dominate Movie World 38
WALTER GREENE

TheSMPTE Salutes the IATSE 39
HERBERT BARNETT

Seamless Screen Specialists 39

The Lure of Wide Pictures 40

"Magic Lantern" to Stereo Sound

(Continued from page 35)

cisco" and "Mutiny on the Bounty," Motiograph unveiled its now famous Model K projector. It soon became one of the best known projectors of the time. The one-piece shutter was a feature, as was the improved mechanism and base. There was a change from single to double bearings. A faster framing device was located in the front of the mechanism.

Motiograph's present type of sound system was adopted in 1938. Radical improvement became possible when the signing of an agreement with ERPI permitted full use of Western Electric's many patents on sound-reproducing systems.

Fortunately, the outbreak of World War II found Motiograph in the midst of its greatest expansion program, and it required little effort to convert the enlarged facilities to the war effort. Because most of the equipment was modern and capable of producing highly-precisioned parts, it fitted in unusually well with the requirements for turning out essential war materials.

Throughout the war, the major portion of Motiograph's production, with three plants on a three-shift basis, was for Uncle Sam, although some projectors continued to be turned out for civilian use as late as August 1942. Subsequently, Motiograph continued the production of projection and sound-reproducing equipment for training purposes by the armed forces, and took on the production of secret war work.

The production of such equipment naturally gave Motiograph a head start in the development and production of the equipment required by all the new processes of today.

The new postwar projector, known as Model AA, was formally announced in November, 1946. It embodied radical developments and improvements in performance and operation which resulted not only from the work done by an experienced staff of projection engineers, outside consulting engineers and industrial designers, but also suggestions made by projectionists from coast to coast and the entire organization of Motiograph dealers, the men on the installation and service firing line. It featured simplicity of operation and exceptional screen values. It also afforded ease of repair and adjustment in the field.

Complete Drive-in Equipment Ready by 1948

A complete line of drive-in theatre sound systems and in-car speaker equipment for drive-ins of all sizes was announced by Motiograph early in 1948. Hi-Power 115/230-ampere generator sets were an addition to the Motiograph line that same year. The Motiograph 75/115-ampere, high-intensity, reflector-type arclamp was developed in February 1949. In June 1951, Motiograph announced that it would thereafter manufacture and assemble the famous Victor Animatograph line of 16-mm sound motion picture apparatus.

With the advent of 3-D and wide-screen presentation early in 1953, Motiograph was ready with 3-D interlock equipment for any make or model sound-reproducing system; 25-inch diameter magazines for 3-D projection to fit any make or model of projector and sound reproducer; 85-ampere and 115-ampere continuous-duty, 3-D generators designed particularly for interlock projection systems, and a full line of stereophonic sound systems to handle all existing recording techniques.

Equipment for all Advanced Exhibition Techniques

In early 1954 Motiograph introduced the Motiograph AAA projector which permits the presentation of all types of prints without an interchange of sprockets or other components. Coincidently came the Motiograph AAA Penthouse Reproducer designed to reproduce single —or 4-track magnetic sound prints.

The Motiograph dealer organization is comprised of independent theatre supply men chosen in accordance with rigid standards.

The industry now has come to another important milestone of development in screen entertainment, and Motiograph, approaching its 60th anniversary, can look back on every step in this development with pride of accomplishment for Motiograph was there when the whole thing started!

★ ★ ★

Enjoy full profit from CinemaScope shown in its full appeal!...use only Bausch & Lomb Lenses created specially for CinemaScope

Greetings . . .

And Thanks

IATSE Members!

We at Bausch & Lomb are deeply grateful to you for your splendid help in putting across CinemaScope. Your enthusiastic cooperation and expert craftsmanship in projecting CinemaScope have contributed immeasurably to its great success. Thank you again . . . and best wishes for a successful convention.

Your screen shows the difference . . . your boxoffice figures the difference in pay-off. Proof? *Over 90% of the theatres showing CinemaScope* use Bausch & Lomb lenses and cylindrical anamorphic attachments. These theatres put their faith in Bausch & Lomb exclusive know-how . . . gained from creating and producing the first practical CinemaScope optical system . . . from Baltar motion picture camera lenses and anamorphic attachments, to the new Super Cinephor f/1.8 projection lenses. More proof? Ask your dealer for actual lens-by-lens comparison proof that Bausch & Lomb is best by far. Bausch & Lomb Optical Co., 72631 St. Paul St., Rochester 2, N. Y.

BAUSCH & LOMB

SINCE B&L 1853

TO THE MEN BEHIND THE SHOW

. . . the Projectionists

You are the men behind the show. Upon your capable shoulders lies the responsibility for the ultimate success of every motion picture as a medium of entertainment.

Without your skill and experience all the ability of a great director . . . all the technique of master camera men . . . all the warm, living human drama that the art of great stars and a superb supporting cast can put on the film can be lost in the vital moment that the picture is delivered to the screen.

In your hands the finest projection equipment can either make or "break" the show.

For your part in the steady growth of our industry . . . for your share in bringing to millions the world's finest motion pictures . . . for your devotion to duty and a job well done . . . we salute you!

Simplex

MANUFACTURED BY INTERNATIONAL PROJECTOR CORPORATION — DISTRIBUTED BY NATIONAL THEATRE SUPPLY